British Society for the Study of Orthodontics. 1922.

TRANSACTIONS

OF THE

British Society for the Study of Orthodontics.

1922

London:
PUBLISHED FOR THE SOCIETY BY
THE DENTAL MANUFACTURING COMPANY, LIMITED,
ALSTON HOUSE, NEWMAN STREET, W.1

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British Society for the Study of Orthodontics.

An Ordinary Meeting was held on Monday, January 16th, 1922, at 11, Chandos Street, W., Mr. Sidney Spokes, President, in the chair.

The President said before proceeding with the business of the evening he would ask the members to rise in their places while he read the following resolution which the Council submitted to them:

"That the British Society for the Study of Orthodontics has heard with the profoundest regret of the death of Dr. E. A. Bogue, one of its honorary members, and expresses its sincerest sympathy with Dr. Bogue's surviving relatives, and with the dental profession in America, in the great loss that they have sustained."

Agreed to.

The following gentlemen were balloted for and duly elected: S. Wilson Charles, L.D.S., R.C.S.Eng., and H. Levin, 63, Wimpole Street, W.1.

Report of the Secretary on the Paris Congress.

Mr. Harold Chapman reported that since the last meeting of the Council the past-President had received an invitation from the Société Française Orthopédie Dento-Faciale for the Society to send a delegate to their meeting in Paris, which was held on January 7th and 8th. He (Mr. Chapman) had not gone as a delegate because it had not been possible for the Council to meet to appoint one; he had gone purely in a private capacity, so that what he had to say would be said purely as a private member of the Society.

The first thing that perhaps struck one as unusual was that the meeting was arranged for Saturday, Sunday, and Monday, and, in contradistinction to their own Society's meetings, the French Society had one meeting per annum which lasted for several days, beginning at 9.30 o'clock in the morning and going on until 5 or 6 o'clock in the afternoon, hard talking taking place all the time.

The number of people attending the sessions was probably between thirty and sixty. Seeing that it was the first annual meeting of the Society, he thought that that was very good. The inauguration of the Society had taken place last Spring at Lyons, and at the dinner it had been stated that the fact that a Society which was born outside Paris should be growing so strongly, was worthy of very notable comment.

From other countries besides France and Great Britain there was M. Dreyfus, of Lausanne, also a member of this Society, who, at the meeting, showed his apparatus, which had been much improved since it was presented here on the occasion when he addressed our own members last year. It enabled one to get the vertical position of the first molar and the canine in relation to the face. As at the next meeting of the British Society in February Mr. Friel was to open a discussion on some methods of diagnosis, he thought it would be well if he wrote and asked M. Dreyfus to send his instrument with a brief description, so that it might be shown then. M. Dreyfus called it the "diagnoscope," and it seemed to him that it would be a very fitting complement to Mr. Friel's communication to exhibit it on that occasion.

There was also a member, representative of Belgium. He had also

met there two of their confrères whose acquaintance he had made in America about seventeen years ago, and it had been very interesting to find that they were still continuing to take an interest in orthodontics. As a matter of fact his acquaintance with them begun shortly after he had been to St. Louis to take the Angle course, and they had been very anxious to get some special knowledge of orthodontics, and so it had fallen to his lot to endeavour to supply them with that knowledge. The re-union at the Continental Hotel was a very different affair to those, shall I say original, meetings in Philadelphia.

In France it was the custom to present papers extempore. It was therefore the more unfortunate that at two of the four sessions there had been no stenographer, and it seemed possible that a few of the communications might, for that reason, be lost to those who did not attend the meetings.

The communications, numbering fourteen, dealt almost equally with theoretical and practical aspects of orthodontics. The former perhaps predominated slightly. The titles of the papers were as follows :—

Dr. FREY read a paper on the " General Etiology of Mal-occlusion as Regards the Mal-position of Teeth and Jaws."

Dr. PONT who unfortunately was unable to be present owing to illness, was to have read a very important paper entitled " The Basis of a New Classification." Two hours had been reserved for the delivery of that paper.

Dr. GEORGES VILLAIN read a paper on " The Articular Equilibrium in Maxillo-Facial Corrections."

Dr. HENRI VILLAIN read a paper on " The Treatment of Mal-position of the Jaws in Children."

Dr. Dreyfus read a paper on his Diagnoscope—an instrument to diagnose mal-position of the jaws in relation to the face.

Dr. IZARD read a paper on " The Choice of a Horizontal Plane of Orientation in Facial Orthopædia," and also one on the " Treatment of Mandibular Retrusions by the Rogers Method."

Dr. J. T. QUINTERO gave a paper on the " Construction of the Transpalatine Arch for the Correction of Narrow Arches."

Dr. STUHL showed a fixed retaining apparatus without de-vitalising the teeth, which was applicable in bridge work as well as in orthodontics.

Dr. SIFFRE gave a communication on the " Temporary and Permanent Dental Arches."

Dr. DE NEVREZE showed some applications of the lingual arch, the particular point being that he used two vertical tubes on the molar bands instead of one ; he also showed a small instrument which he had made that enabled one to solder on the tubes exactly parallel.

Another practical point had been shown by Dr. DARCISSAC namely, the treatment of over-bite by a fixed appliance. It consisted of two bands on the central incisors which were soldered together, on the back of these was soldered an inclined plane, so that the patient had to bite forward, and of course at the same time that opened the bite. With that alone he had effected considerable improvement.

Dr. GEORGES VILLAIN also showed two instruments for making facial measurements, whilst not quite similar to the prosopometer, yet were of that type. The origin of the instruments was interesting. Whilst lecturing to his class one day, Dr. Villain had referred to the fact that he had long wanted an instrument to obtain certain data concerning the head and face but that he himself had never had the time to work out one. So he left it to his students to do. At the next meeting of the class, a week later, two students had presented him with instruments which each had made. Whilst they were not shown as the last word in such things, they were very well turned out, and would be very useful to anyone wishing to work along such lines.

The meeting closed with a very enjoyable dinner at the Hotel Continental, at which ladies were present. That had been followed by a concert, and was another proof that their confrères across the water knew how to do such things to perfection. So a very successful meeting had been brought to a conclusion, with wishes that they would all meet together again next August or September at Lyons where the next meeting would be held.

He felt sure that their French colleagues would welcome an international meeting, from many conversations he had had.

The officers of the French Society were to be congratulated on the success of their first meeting; in such capable hands the life of their Society was assured.

The PRESIDENT said the members were indebted to Mr. Chapman for his report. He might say that it was very late when the communication arrived asking the Society to appoint a delegate, and the outgoing President had taken it upon himself, very properly he (the President) thought, to nominate Mr. Chapman to represent the Society in Paris. He thought it might be considered that Mr. Chapman had represented the Society, and they must thank him for so doing.

Mr. NORTHCROFT said there was one point which Mr. Chapman had not made quite clear in reference to the two parallel tubes on the lingual arch. Mr. Chapman had omitted to say that the two parallel tubes were on the same band; that was to say, there were four tubes altogether on the lingual arch.

Mr. CHAPMAN proceeded to give a blackboard demonstration of the design, and added that the arch went across the palate instead of going round the lingual surface of the teeth. He thought the origin of it was that Dr. Quintero wanted to use a lingual arch where the overbite was so great that it was impracticable to rest it against the palatal surface of the upper incisors, and so he designed the trans-palatine arch; he had springs on each side extending to the canines whereby to get the expansion but there was nothing behind the incisors.

Mr. SIDNEY SPOKES then delivered the

PRESIDENT'S INAUGURAL ADDRESS.

Members of the British Society for the Study of Orthodontics. My first words, of course, must convey an expression of thanks to the Society for putting me in this honourable position. But I am at a loss to know why I have been thus honoured, because although I have taken an interest in the Society, I cannot claim to have been an active member. I have enjoyed attending its meetings when I have been free to do so, but my output to the proceedings has been of a negligible character. Some of the most refreshing communications, perhaps, have been those in which the author, so far from claiming *kudos*, did not hesitate to admit that he was disappointed in some of his results. I remember that when the Society was established certain objections were raised, such as that the subject was one which could naturally be dealt with by the Odontological Section of the Royal Society of Medicine, and that at all events the latter might be prejudiced by having orthodontics taken away from its general consideration. A somewhat similar criticism was that the Society would tend to establish a specialism to the detriment of the ordinary dental practitioner. For my own part none of these or similar objections had any weight and I was glad to help those who were desirous of forming this Society for the Study of Orthodontics, by becoming a member. I think it must be admitted that the results have justified the undertaking. Whilst even the most assertive, or shall we say dogmatic, opinions as to treatment may have been held and expressed, I imagine that no one member holds that finality has been reached, but that on the contrary the main object of the Society is still demonstrated by the word *study* in its title. To one who for thirty-five years has watched

the varying stages of development and modification of theories and modes of treatment, the maintenance of an open mind seems most desirable. Specialism need not produce a rule of thumb, but should rather cultivate an ability for the exercise of judgment to be applied in each particular case And when one looks through the proceedings and finds the valuable papers contributed, and realises the opportunity that has been afforded for free expression and interchange of ideas and opinions, then all doubt as to the usefulness of this Society must vanish. But whilst no apology is needed, it may be interesting to consider the question of specialism. It was formerly much criticised, and the possible tendency of some practitioners to exaggerate its importance has led to a certain amount of reaction in the public mind. But after all, the principle is not restricted to medical and surgical matters ; it is applicable to all departments of public life and commerce. With the ever-increasing accumulation of ascertained facts, it would seem to be a natural outcome that in order to utilise scientific knowledge for the public benefit, a steady advance from the merely empirical treatment must occur. A repetition of generalised routine methods gradually elaborated by new and modified discoveries and proved facts must, in time, produce branches of treatments adapted to special organs and tissues and the process by which this has been brought about might be described as " successive re-crystallizations of primitive chaotic ideas." The specialist necessarily extends the boundaries of knowledge, and if we postulate that he builds upon a wide, deep, sound foundation, is sure of his facts, and applies them honestly, he is a public benefactor. Francis Bacon, however, in language which sounds quaint nowadays, gives a warning : " This subject of man's body is of all other things in nature most susceptible of remedy ; but then that remedy is most susceptible of error. For the same subtilty of the subject doth cause large possibility and easy failing ; and therefore the inquiry ought to be the more exact." And this susceptibility of error in the treatment of the ills of the human body leads us naturally to consider the relationship between practitioner and patient. We know that from time to time cases occur in which the latter complains that the former has been unskilful, negligent, careless, or even ignorant. As W. Trotter* says : " the average educated man is willing to pronounce decided judgments, all of which he believes himself to have arrived at by the exercise of pure reason, upon the innumerable complex questions of the day. Almost all of them concern highly technical matters, upon none of which has he the slightest qualification to pronounce." Such a one does not hesitate to formulate charges against his medical or dental attendant or against his lawyer. It has been my business for some years to assist in considering charges and claims made against medical and dental practitioners. One can hardly conceive anything more worrying if, and when, such a catastrophe happens ; and yet it is to be feared that many disregard the possibility arising at any unsuspected moment, and fail to realise the necessity of providing protection. There *is* such a danger and it usually comes in a most unexpected manner. It cannot be assumed that in the practice of orthodontics there is freedom from such a risk, and after my experience in such cases, I feel that I cannot better fulfil a friendly duty to those members of this Society who have not yet joined a professional defence society than to point out the serious position in which they leave themselves, and to urge them to remedy it without delay.

Even the simplest things may lead to a case being formulated against the practitioner, and which may turn out in the end to be a very elaborate and painful business for all concerned. Even the ordinary question as to whether an act was careless or whether it was negligence, or whether it was a pure accident is very difficult to determine in some of the cases. One of the most recent cases is that in which

* " Instincts of the Herd in Peace and War," 1916.

the operator, having used a syringe—an injection syringe—placed it upon the table. He did not place it far enough on the table, and it slipped, the needle going into the patient's hand. The result is that a very unfortunate and very serious claim has been made against that dentist. It is easy for the practitioner to say it was a pure accident. The patient says it was carelessness. We know that it was a pure accident—that he did not intend to do anything of the sort. It was an accident that might happen to anybody, but from the patient's point of view the practitioner was careless because he did not really deliberately put his syringe down and see that it was on the table and could not slip.

Another case was a still more painful one, where the practitioner, with the patient in the chair, turned away to do something to the controller of his electric engine. He looked away from the bur in the handpiece. The patient turned round to see what he was doing, and the bur went into the patient's eye. That eye was lost, and very nearly the other one also. Those are cases that fortunately do not come along very often, but they are liable to occur to any practitioner, and I cannot help thinking that we do not pay sufficient attention to protecting ourselves against such events.

I think I shall best be serving the interests of the Society this evening by finishing my remarks here, instead of launching out any further with regard to that protection; but I do honestly think it is worthy of the serious consideration of any of you who have not thought about it.

The Session before us promises to be an interesting and useful one and with the assistance of such well-tried friends as our Secretary and Treasurer, I am led to hope that my year of office may justify to some extent the goodwill you have shown in placing me in this chair.

Mr. NORTHCROFT expressed on his own behalf and on behalf of the members their thanks to the President for his very valuable address. He thought the members would certainly take the President's words to heart, and not only be cautious in their methods of practice, but protect themselves from any dangers in which they might be involved with regard to their patients. He begged to propose a most hearty vote of thanks to the President for his address.

The motion was put and carried with acclamation.

The following paper was then read by Mr. CAMPION:

REPORT ON SOME MODELS OF CASES FOR THE MUSEUM.

By GEO. G. CAMPION, L.D.S. and B. MAXWELL STEPHENS, L.D.S

HUXLEY once published a volume of essays which he entitled "Methods and Results." In orthodontics during the past quarter-century many books and papers have been published giving quite adequate accounts of methods and quite inadequate accounts of results, and this inadequacy in dealing with results is largely due to a failure to discriminate between immediate results and final results, and yet between these two lie all the phenomena embraced under the term "Relapse." The final results of many cases have often been given in terse admissions that while they were quite successfully treated they turned out in the end failures owing to the occurrence of relapse. If this be so it would seem that one of the ways of advance in the future lies actually in the study of relapse, so that with more ample knowledge of the conditions and factors which bring it about, we may collectively be enabled to apply methods under those conditions which minimise it as far as possible.

It was with something of this in mind that the Council about two years ago invited members to contribute models and other data of cases which had been treated, including the results obtained, but made it at the same time a condition that no case should be accepted which did not show the conditions of the dental arches at least two years after all retention appliances had been discarded. It was considered that in the two years following the removal of all retention appliances any relapse which was immanent would have had time to show itself.

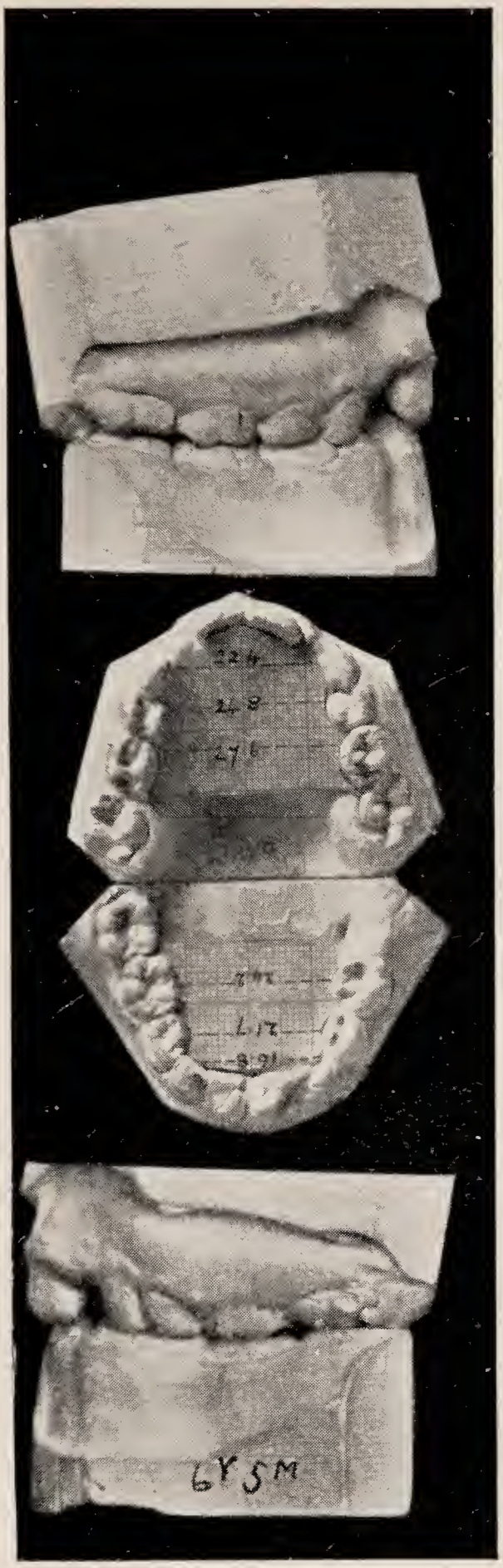
We present this evening the results of a detailed examination of four cases. Of these, two were contributed by Mr. Chapman, one by Mr. Northcroft, and the fourth is one of several series of models presented to the Society some years ago by Dr. Bogue.

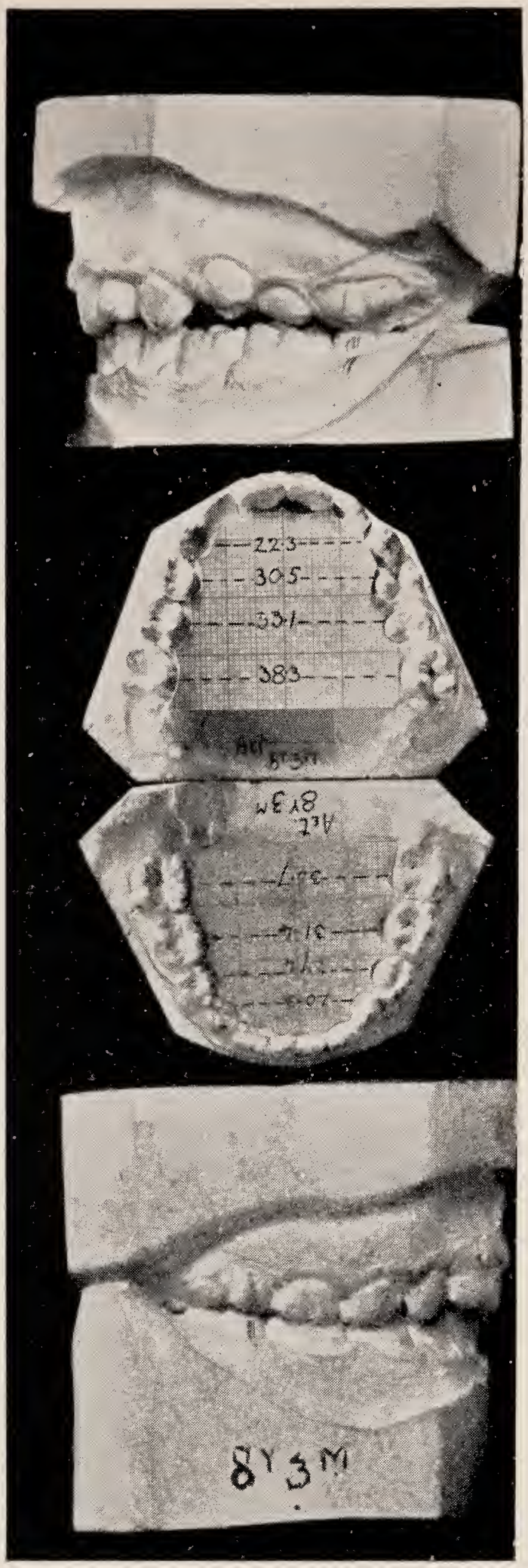
Of these four cases three of them present irregularities associated with narrow arches with normal or subnormal mesiodistal occlusion, and are of the kind often known as those of Angle's Class i. The fourth case, that presented by Dr. Bogue, is a case where the upper incisors are thirteen millimetres in advance of the lowers and the latter biting on the upper gum. A case of the kind often known as Angle's Class ii., Division 1.

Our method of examination has been to measure across the dental arches between corresponding teeth at successive stages of the treatment and over the whole period covered by the models and we give these measurements in tables. We have noted the expansion brought about under treatment and compared the measurements made of models at the conclusion of treatment with those made of models taken two years or more after all retention has been discarded; this has enabled us to record the amount of relapse which has taken place, and after deducting this and ascertaining how much of the original expansion has been retained. We have called this the residual expansion.

One of the most interesting facts disclosed is that presented by the alterations in both upper and lower canines in Drs. Bogue and Baker's case. The uppers were expanded 3.7 mm., suffered a relapse of 3.5 mm., and at the age of 20 were only .2 mm. farther apart at the tips than at the age of 10 years. In the lower arch the canines were expanded 1.4 mm., but being afterwards subjected to the pressure in occlusion of the relapsing upper canines, were driven into positions nearer together than they occupied before treatment by 1.7 mm. In contradistinction to this repulse of the canine we find in the same case that the upper second premolars were expanded 4.7 mm., of which they had retained at the age of 20 no less than 4.0 mm., and between these two extremes of expansion and relapse there is a great deal of variation.

Another interesting fact which emerges is that in case 3, one of Mr. Northcroft's, in which he produced an expansion of 8.0 mm., which had relapsed to 5 mm. at the age of 13 years 4 months, had again expanded 1 mm. by the time the child had reached the age of 15 years 3 months, and this expansion seems to have been general and not confined to the region of the premolars. We regard this as an example of the growth of bone at the intermaxillary suture which was demonstrated at the last meeting by Sir Arthur Keith.





Arch measurements between		Sept. 26, 1911. 6 yrs. 5 mths.	July 30, 1913. 8 yrs. 3 mths.	Jany. 7, 1921. 15 yrs. 9 mths.	Expansion.	Relapse.	Residual Expansion.
Upper.	C & 3	22.4	22.3	24.6	—	—	—
			D | 4				
	D & 4	24.8	30.5	27.3	5.7	3.2	2.5
			E | 5				
	E & 5	27.6	33.1	30.3	5.5	2.8	2.7
	6 & 6	—	38.3	33.9	—	?	—
			^				
Lower.	C & 3	16.8	20.3	18.1	—	—	—
	D & 4	21.7	27.4	26.0	5.7	1.4	4.3
	E & 5	24.2	31.4	27.1	7.2	4.3	2.9
	6 & 6	—	35.7	31.3	—	4.4	—

Report on Some Models.

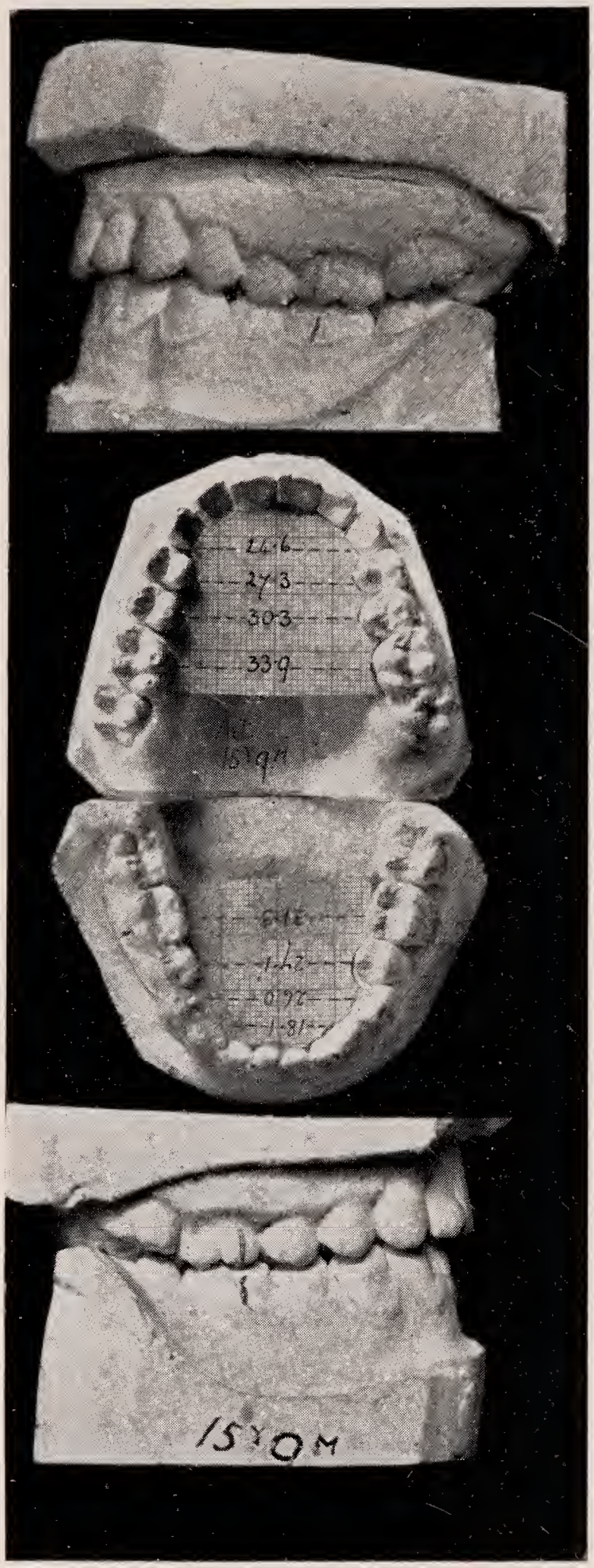
HAROLD CHAPMAN Case 28. Table I

Sept. '11. 6 years 5 months. Lower expansion (Highton).
Nov. '11. 6 years 7 months. Upper expansion (Badcock).
Jan. '12. 6 years 9 months. Lower Badcock.
May '12. 7 years 1 month. Retention *plates*. Lower with springs to push out $\overline{2|2}$
July '12. 7 years 3 months. Band on $\overline{1|}$ to rotate it.
July '14. 9 years 3 months. Retention plates discarded.
Jan. '21 15 years 9 months. Final models.

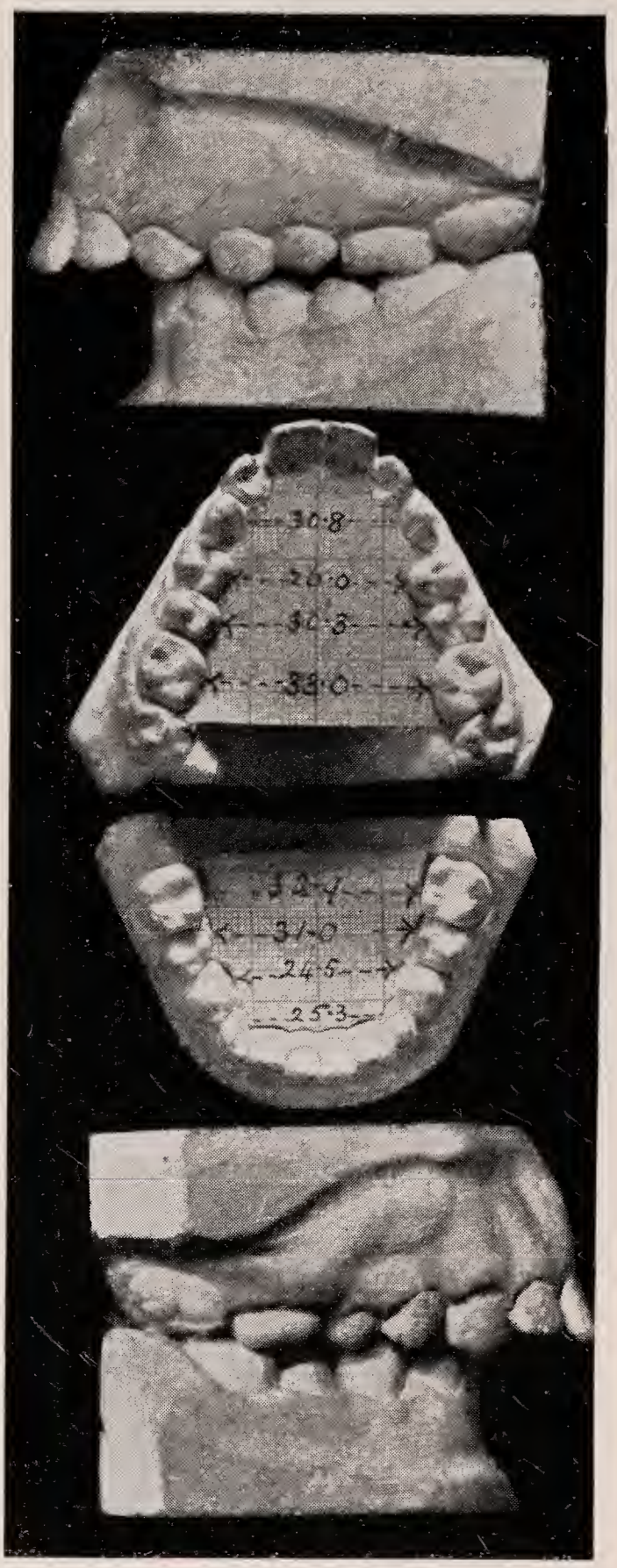
Treatment = 8 months.

Retention = 2 years 2 months.

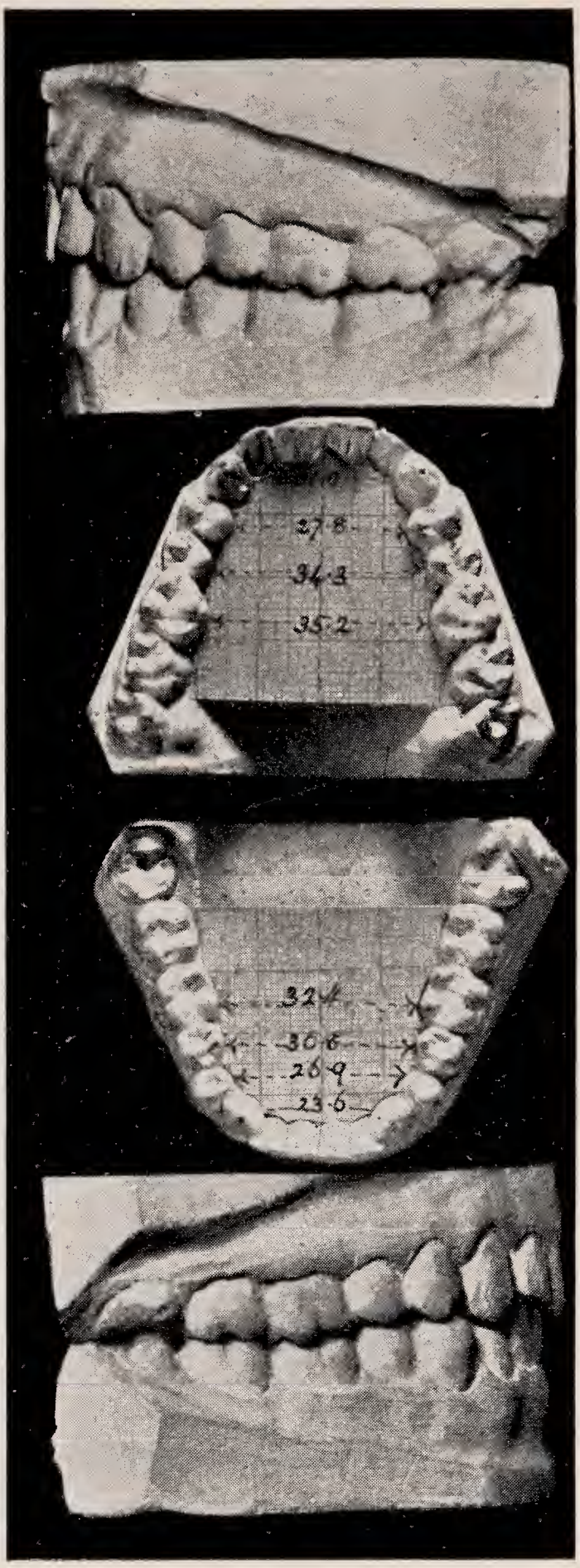
To illustrate article in April Dental Record.



Case 28 (1).
Mr. Harold Chapman.



Case 3.
Dr. Baker.



	Arch measurements between	10 years	15 years.	20 years.	Expansion	Relapse.	Residual Expansion.
Upper.	3 & 3	30.8	34.5	31.0	3.7	3.5	.2
	4 & 4	26.0	30.0	27.8	4.0	2.2	1.8
	5 & 5	30.3	35.0	34.3	4.7	.7	4.0
	6 & 6	33.0	37.2	35.2	4.2	2.0	2.2
Lower.	3 & 3	25.3	26.7	23.6	1.4	3.1	−1.7
	4 & 4	24.5	*29.0	26.9	4.5	2.1	2.4
	5 & 5	31.0	33.6	30.8	2.6	2.8	−.2
	6 & 6	32.9	35.0	32.4	2.1	2.6	−.5

Report on Some Models.

DR. BAKER'S CASE (3).

Stated by Dr. Bogue to be the first case treated by "Baker's Anchorage."

Models in the Society's Museum presented by Dr. Bogue.

No details of treatment.

All *canine* measurements have been taken from the tips; the teeth being only about half erupted at date of first models.

(* Measurement estimated retention bands on teeth.)

CASE 2.

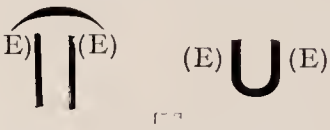
Arch measurements between		Oct. 30, 1912. 8 yrs. 7 mths.	April 7, 1913. 9 yrs. 1 mth.	July 28, 1915. 11 yrs. 4 mths.	Jan. 19, 1920. 15 yr. 10 mths.	Expansion.	Relapse.	Residual expansion.
Upper.	C & 3	<38.4	40.7x	—	41,5x	—	—	—
		27.0	29.5	∧	25.7	—	—	—
	D & 4	28.5	31.2	30.5	29.1	2.7	2.1	.6
	E & 5	30 6	34.0	34.5	34.0	3.9	.5	3.4
	6 & 6	31.0	37.5	35.6	36.6	3.5	.9	2.6
Lower.	C & 3	c | c 19.7	c | c 22.0	3 | c 20.0	3 | 3 18.3	—	—	—
	D & 4	23.7	26.0	27.3	26.0	3.6	1.3	2.3
	E & 5	27.5	30.5	30.5	29.7	3.0	.8	2.2
	6 & 6	33.7	36.0	35.0	35.0	2.3	1.0	1.3

HAROLD CHAPMAN. CASE 82.

Nov. '12. 8 years 8 months. Bucc. arches bands on $\frac{E \mid E}{E \mid E}$

Jan. '13. 8 years 10 months. I.M.T.

April '13. 9 yrs. 1 m Upper and Lower retainers



May '13. 9 years 2 months. Insert bite plates.

Sept. '13. 9 years 6 months. Upper bite plate and retainer combined.

May '14. 10 years 2 months. New upper bite plate and retainer.

July '14. 10 years 4 months. New upper bite plate and retainer.

Nov. '14. 10 years 8 months. Lower vulc. retainer.

Aug. '17. 13 years 5 months. Both retention plates discarded.

Jan. '20. 15 years 10 months. Final models.

Treatment = 6 months.
Retention = 4 years 4 months.

We have in a separate table tried to compare the three cases accompanied with details of treatment with one another, and for this purpose we have taken as a means of comparison the width across the upper arch between the two second temporary molars or their succeeding premolars. We are aware that a difficulty which Mr. Northcroft has pointed out arises here owing to the palato-buccal diameter of the second temporary molar being different to that of the second premolar, but despite this we find the measurement a convenient one for comparing different cases. The results of this are in the table

No. of Case	Treatment (expansion). Begun	Ended	Duration	Retention. Begun	Ended	Duration	Date of Final Models	Upper 2nd Premolar. Total expansion	Relapse	Residual expansion
	Y. M.	Y. M.	Y. M.	Y. M.	Y. M.	Y. M.	Y. M.			
1	6 5	7 1	– 8	7 1	9 3	2 2	15 9	3.9	.5	3.4
2	8 8	9 2	– 6	9 2	13 5	4 4	15 10	5.5	2.8	2.7
3	7 11	9 6	1 7	9 6	9 9	– 3	15 3	8.0	3.0	5.0x
4	—	—	—	—	—	—	20 0	4.7	.7	4.0

Conclusion.

It seems to us that the detailed examination of these cases has been well worth while. There has been as yet no generalised study of the relapses which take place after treatment, and the examination of these cases convinces us that such a study would be of great value and might save many of us from recapitulating the mistakes in practice of our predecessors. A museum with models accompanied by data of the kind indicated in this report would be serving the highest function of a museum, the function of research as distinguished from the display of material illustrating knowledge of which we are already assured.

Discussion.

Mr. Northcroft, in opening the discussion, said that Mr. Campion had pointed out that his (Mr. Northcroft's) case had been under treatment for one year and seven months and had been retained for only three months. That was a total period of apparatus wearing, of one year and ten months in comparison with some cases which had to be retained for two years, and in other cases four years. Although the expansion seemed to have collapsed, he believed that the occlusal result had been satisfactory; so it did not necessarily follow that because the expansion of a case had partially collapsed the total result became unsightly, or that one should jump to the conclusion that such treatment was undesirable. He thought that with regard to all the cases which had been shown the operators had been fully justified in undertaking the treatment.

Mr. Campion said he was afraid he had not made himself clear. The expansion had not collapsed. It had collapsed a little, but there had been a great expansion left in that case of Mr. Northcroft's. They regarded it as a most successful case. In fact, the very point which they desired to make was that actually in the most successful cases one did get a certain amount of relapse.

Mr. Housden said the point which had struck him was that in Mr. Chapman's case the treatment had lasted for quite a short period but in Mr. Northcroft's case the treatment had lasted much longer and the result had been ever so much better. Although it was retained for a shorter period. Mr. Chapman's case had been retained for four years and Mr. Northcroft's case for three months, yet the main result had been much better. It pointed to the fact that the more slowly the teeth were moved the better they were retained in their new positions.

Mr. Pitts remarked that Mr. Campion had referred to Mr. Northcroft's observation that the palato-buccal diameter of the deciduous molars varied from that of the premolars. That, of course, must make a difference in measurement across the palates of the same cases at different ages. It struck him that one way of getting over that would be that if a very large number of sections of the palato-buccal and of the antero-posterior diameters were made of the deciduous molars and premolars were made not necessarily from the same mouth, and those measurements compared, it would be possible to get an average index figure of the difference, which could be used as a correction in making measurements of those cases. Unless one did something of that sort, one might get a failure, particularly where expansion was, after all, only measured in millimetres.

Another small point which had struck him was that he noticed that the measurements were taken from the anterior corner of the teeth.

Mr. Campion said that was not so; it was simply an error.

Mr. PITTS said in the case of the second deciduous molars in the upper jaw there was very frequently a well-marked accessory cusp; and a measurement taken in that region, again, would make an additional error in comparing the palatal results.

Mr. RUSHTON said the paper bore out what most practitioners had found in their experience, namely, that in cases of expansion sooner or later the teeth seemed to tend to go back to their pristine condition. He had seen a case the other day which had been satisfactorily expanded many years ago. The patient was now about 21. It still showed it was well worth while expanding those arches and making those teeth regular; but the fact remained that those teeth tended to go back to the irregular position in which they were when the case was first seen. There was another case he had in mind in which a central incisor was prominent, and which had been put back into position when the girl was quite a child. She was now a woman of over 30, and her tooth still tended to come forward, and she still wore a retention plate every night of her life. If she did not, that tooth would go forward. In cases in which extraction had been performed, one did not get those relapses; one might be pretty certain that the teeth, when they were once put into their proper positions and given a proper amount of room to keep their positions, would retain them. Very often those cases could be done without any appliance whatever, and were most satisfactory and permanent in every way.

Mr. CHAPMAN said he thought the Society had been justified in appointing Mr. Campion and Mr. Maxwell Stephens to go through the cases which had been submitted to them. To his mind they had undoubtedly presented the results of treatment in a form which the members had not had an opportunity of seeing before, and he thought the analysis had probably been as startling to the persons who had done the treatment, as it had been to those who had investigated it. He should like to express his thanks to both gentlemen for the great amount of time and labour which they had put into the cases, and for showing the members what had really taken place.

With regard to the details of the treatment, of course they must necessarily be brief when tabulated in the form in which they had been shown; but he must say that personally he believed in retaining such cases for a very long time—not necessarily saying that the patients should wear their retention for every twenty-four hours till the end of the treatment, as might be inferred from the tables exhibited, but only for a portion of each twenty-four hours. So that it was necessary to be a little careful in exactly interpreting what they had been shown on the screen. Nevertheless, it was a revelation to see that there was such a large amount of relapse and such very little residual expansion.

Mr. Campion in his opening remarks had referred at length to the question of relapse, and he (Mr. Chapman) had been extremely interested in that. In July of last year he had seen a patient of about 16 years of age who had been treated not in this country at all, but by a very good orthodontist, a man who did excellent work. Although he had never met him, he had seen a considerable amount of his work. The original condition of the case he (Mr. Chapman) did not know. As far as concerned the occlusion now, the result was perfect, but the patient appeared to be all teeth, and there seemed to be no evidence of any relapse at all. The mother of the child was greatly perturbed at her appearance, and wanted to know whether anything could be done to reduce the appearance of the teeth. He had not given any definite opinion. They were leaving for the Continent the next day or very shortly after; but he had not been able to bring himself to advise them to have the premolars or any other teeth removed because he did not feel confident that the relapse, which had been seen on the screen, would take place in that particular instance. In private conversation he had heard that Mr. Northcroft had also seen the case,

so that he would be able to supplement any remarks he himself had made about it.

In the same connection, in a case of his own in which he had brought about a considerable amount of expansion, there was not yet quite room for all the teeth; but the expansion was so severe, if he might use that expression, that he had not felt justified in going any further. In fact he had felt he ought to so something to make it less, and to remove, say, two premolars; but there, again, one was faced with the difficulty as to whether a relapse would occur in a case in which it was desired. He merely mentioned that to show that there seemed to be another aspect of the matter, and that the residual expansion might, at times, be greater than anticipated.

Mr. SCHELLING said in regard to Mr. Chapman's case, where the patient appeared to be "all teeth," it might possibly be something to do with the amount of fatness or thinness of the patient's face. Many years ago he had made two complete sets of teeth for a lady of 60. She looked very well with them, and as she got older he did not notice any difference. Then he did not see her for ten years, and he was really horrified at the appearance of the old lady; she seemed all teeth. He took out a bicuspid on each side in upper and lower jaws, and put the front teeth back, and she then presented a normal appearance. Shortly afterwards he had met a friend of his with his mother, also a lady of 80, and who also presented exactly the same appearance of "all teeth." His friend was a professional man, so he mentioned to him that he had seen a similar case and the fact that he had removed a bicuspid in each of the plates. His friend replied that that was all very well, but that his fortunate mother had all her natural teeth still!

Mr. CHAPMAN said the patient to whom he had referred could hardly be described as thin.

Mr. W. J. MAY said he had been interested in the remarks about the patient with one central incisor, for he had seen an exactly similar case in a child. He was the second practitioner to treat the case. The incisor had been brought back into his place, having been retained by a band for six months, and then with a plate. There was no reason that he could see why it should not stop there, but directly the plate was removed the tooth came forward again.

With regard to Mr. Chapman's case, he also was treating a child at present who might certainly be described as "all teeth." The child was about 11 years of age when he first saw her, and he had decided to remove a premolar on each side. He hoped to show the result later on; at any rate, it was going on very well indeed. He had had to expand the arch, and the expansion had not relapsed.

The PRESIDENT said the members were much indebted to the authors for the work they had done. He hoped the members would supply them with more material so that their studies might be continued, and that the authors would be willing to continue their investigations.

He had been hoping that some members would have referred to the question of the canines. Mr. Campion would not claim that the results already brought before the Society were sufficient to warrant a certain line of action; but when the photographs showed that the canines were about in the same position at the end of the treatment as they were at the beginning—in one case slightly less if anything—it almost seemed to him that orthodontists might save themselves the trouble of trying to move out those upper canine teeth and be content to get an expansion, which had proved so very satisfactory, behind them, further back in the mouth. That might, in a way, be considered a simpler method of treatment, and might be taken into the general survey when mapping out what particular movement should be aimed at at the commencement of the case. It would be very interesting

indeed if the members could have further figures and statistics with regard to the action of the canines. So far as the central incisors in the upper jaw were concerned, he thought it was the experience of everybody that if there was any tendency to move at all they would move. There was nothing whatever to keep an upper central incisor into the line. When a lower incisor was pushed forward, it would stop in its place and would not go outside, because it was kept in place by its corresponding incisor in the upper jaw ; and that was where the lower incisors were much more satisfactory to deal with than were upper incisors. So that he did not think anyone would be surprised at finding a tendency for the upper incisor to wander away in a place where there was no resistance, except perhaps the upper lip. If it got out so much that the muscular lower lip should get behind it, then there would be still more trouble.

In returning the members' very sincere thanks to Messrs. Campion and Maxwell Stephens for their communication, he would like to invite from those gentlemen an assurance that they would continue their investigations, and an assurance from the members that they would all promise to furnish the authors with sufficient material.

Mr. MAXWELL STEPHENS, in reply, thanked the members for the reception they had given to their report. He would say that the report should not cause hesitation in taking up expansion as a method of treatment, but rather cause consideration as to the rate at which the expansion should be made, and also the rate of retention.

Mr. Campion and himself would be very pleased to continue their investigations if the members supplied them with material.

With regard to the moving of the central, he had seen a case the other day where the central had protruded again immediately, and the only way in which the practitioner could hold it was by making a couple of pits in the lingual surface of one incisor and corresponding pits in the neighbouring tooth, and putting in a couple of stout platinum staples. Those staples had been in a matter of ten years, and were perfectly satisfactory. He had thought that that had been a daring and cunning thing to do.

The PRESIDENT, in closing the meeting, mentioned that the Council had had under its consideration the question of the copyright of papers read before the Society, and that it was their intention at some future time to bring before the Society—perhaps at its annual meeting—a resolution declaring that the copyright of the papers read before the Society would be vested in the Society. He just mentioned it that evening so as to warn any intending contributors that their papers should be regarded as belonging to the Society after they had once read them there.

AN ordinary meeting was held at 11, Chandos Street, W., on Monday, February 6th, 1922, Mr. P. SIDNEY SPOKES, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following newly-elected members signed the obligation book and were formally admitted as members of the Society: Messrs. Achner, Bryant, Newton, Packham and Wright.

The following, having been approved by the Council for election, were unanimously elected: Gerald Harborow, L.D.S., R.C.S.Eng., 38, Woburn Square, W.C.1.; Miss Petronel Iago, L.D.S.Eng., 1, Devonshire House, High Road, Brondesbury, N.W.2.; Theodore G. Skipper, L.D.S., R.C.S.Eng., 52, Welbeck Street, W.1.

The PRESIDENT stated that Miss Iago had the distinction of being the first lady member of the Society.

Mr. SHELDON FRIEL opened a discussion on

ORTHODONTIC DIAGNOSIS.

Mr. Sheldon Friel said he felt rather diffident in opening this discussion because the value of many of the methods he would suggest had not yet been proved. According to the strict interpretation of the title "Diagnosis," one would be limited to identifying cases of malocclusion by their symptoms, etc., but he

Name

No. 590.

Age 5 yrs. 9 months

Date Oct. 25 1920

Diet :—

1. First year—Natural, Artificial or Mixed

If Artificial Nature of Food

Weight 14·2 Kilg Height Sitting 53 cms.

Handgrip

Pelidisi

Including plaster leg splints

1. First to Sixth year

3. Present diet—Breakfast

Lunch

Dinner

Tea

Sweets and Fruit

Character of Mastication (normal, vigorous or feeble)

Maximum pressure between molars, Right

Left

Breathing Normal

Adenoids, etc

Nose

Lips

Max-pressure

Tongue

Habits—(a.) Comforters, etc.

Length of time used

(b.) Sucking or biting fingers, etc.

General Health, Illness Rickets

1st tooth erupted 2 years old.

Cannot stand or walk.

Fig. I. (Front).

thought that, for the purposes of practical orthodontics, diagnosis and ætiology were so intimately associated it would be a valuable addition to the discussion to introduce some new instruments and methods which had been evolved in order to more readily arrive at correct causations. In order that a rational

diagnosis could be made, it appeared essential that a definite system of examination should be carried out in each case, and that the results of that examination should be recorded on a chart. For that purpose he had drawn up a chart that was not so elaborate as the chart adopted by the Society some years ago (Figs. I and II). The examination was divided into three parts: first, the bodily conditions; secondly, the oral conditions; and thirdly, the occlusal conditions. With regard to the bodily conditions, was it possible to discover the degree or extent of nourishment of the child by measuring the weight and height? Prof. Von. Pirquet, of the children's clinic in Vienna, had worked out a formula for determining the degree of under-nourishment of children, and called it "pelidici"; it was the cube root of ten times the weight

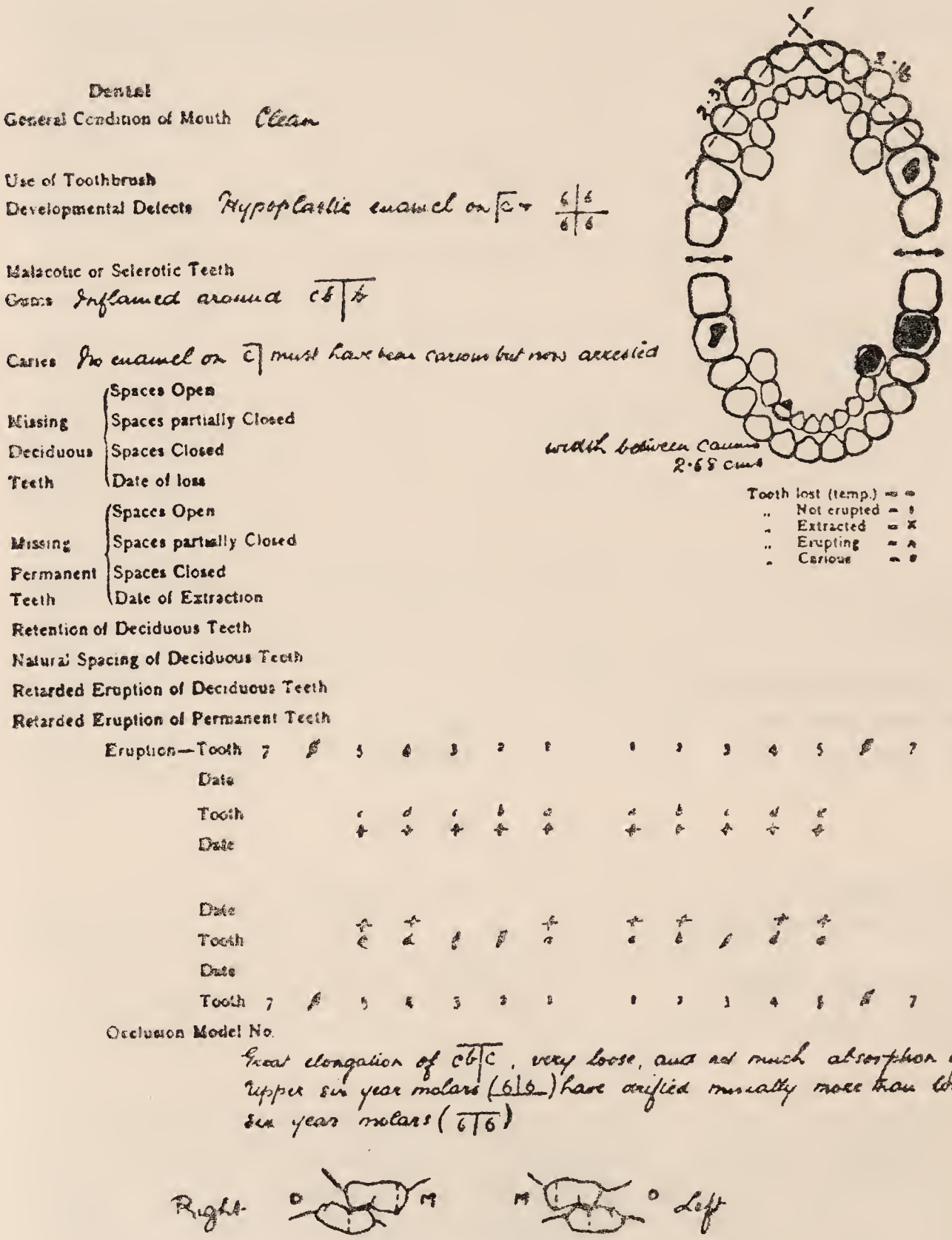
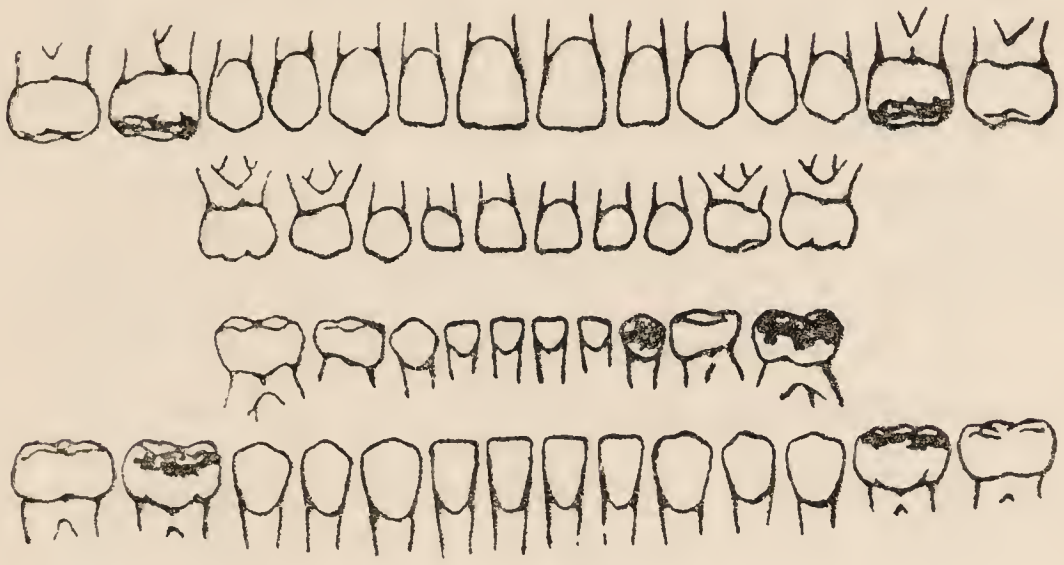

Dental
General Condition of Mouth Clean
Use of Toothbrush
Developmental Defects Hypoplastic enamel on c̄ 6|6 / 6|6
Malacotic or Sclerotic Teeth
Gums Inflamed around c6|6
Caries No enamel on c̄| must have been carious but now arrested
Missing Deciduous Teeth: Spaces Open; Spaces partially Closed; Spaces Closed; Date of loss
Missing Permanent Teeth: Spaces Open; Spaces partially Closed; Spaces Closed; Date of Extraction
Retention of Deciduous Teeth
Natural Spacing of Deciduous Teeth
Retarded Eruption of Deciduous Teeth
Retarded Eruption of Permanent Teeth
Eruption—Tooth 7 6 5 4 3 2 1 1 2 3 4 5 6 7
Date
Tooth
Date
Date
Tooth
Date
Tooth 7 6 5 4 3 2 1 1 2 3 4 5 6 7
Occlusion Model No.
Great elongation of c6|c, very loose, and not much absorption of roots.
Upper six year molars (6|6) have carried mesially more than lower six year molars (6|6)
width between canines 2·68 cms
Tooth lost (temp.) = o
" Not erupted = 1
" Extracted = X
" Erupting = ^
" Carious = •
Right D M
M D Left

Fig. II. (Back).

in kilogrammes over the sitting height in centimetres. The formula was difficult to work out, but it had been worked out in the form of a table, so that if one knew the weight and sitting height one could tell at a glance the "pelidici." Where the "pelidici" ranged between 95 and 100 the child was considered normal;

NAME _____ NO. 590



DATE Oct 25 1920 Fig III

when it was below 95 the child was under-nourished, and when it was over 100 the child was over-nourished. That method of examination was used to a large extent in Vienna for the examination of school-children under the American Relief Mission, and although it was not as good as a thorough medical examination, it seemed to be worthy of consideration. So far he had not examined a sufficient number of children to be able to state what the relation of malocclusion was to a low "pelidici," but he thought there was a relation. It was very probable that a low "pelidici" was a bad prognostic sign for the successful treatment of a case. The second method he would suggest was the use of various forms of dynamometers for testing the strength of different muscle groups, such as the hand grip, the jaw pressure—the maximum pressure between the jaws at the region of the first molars and between the incisors—the tongue pressure and the lip pressure Johnson and Hatfield of Boston in a paper published in the *Cosmos* of June, 1917, showed very clearly that there was a relation between normal dentures, the hand grip and the jaw pressure, and also a relationship between abnormal dentures, the jaw pressure, and hand grip, and that the pressures in the latter cases were considerably lower than in the former. It was quite possible that there was a definite relationship between all those different muscle groups and that the cause of the malocclusion was much deeper than the oral conditions would lead one to believe. It was possible, too, that a low jaw-pressure and a low tongue-pressure were related

to the consistency of the food that was used. Lip pressure was undoubtedly low in cases of mouth-breathing, but whether the lip pressure was the result of the mouth-breathing or the mouth-breathing the result of the low lip pressure was a matter for consideration.

The slide (Fig. IV) showed one of the graphs taken from Johnson and Hatfield's paper in the *Cosmos*. The two top curves denoted

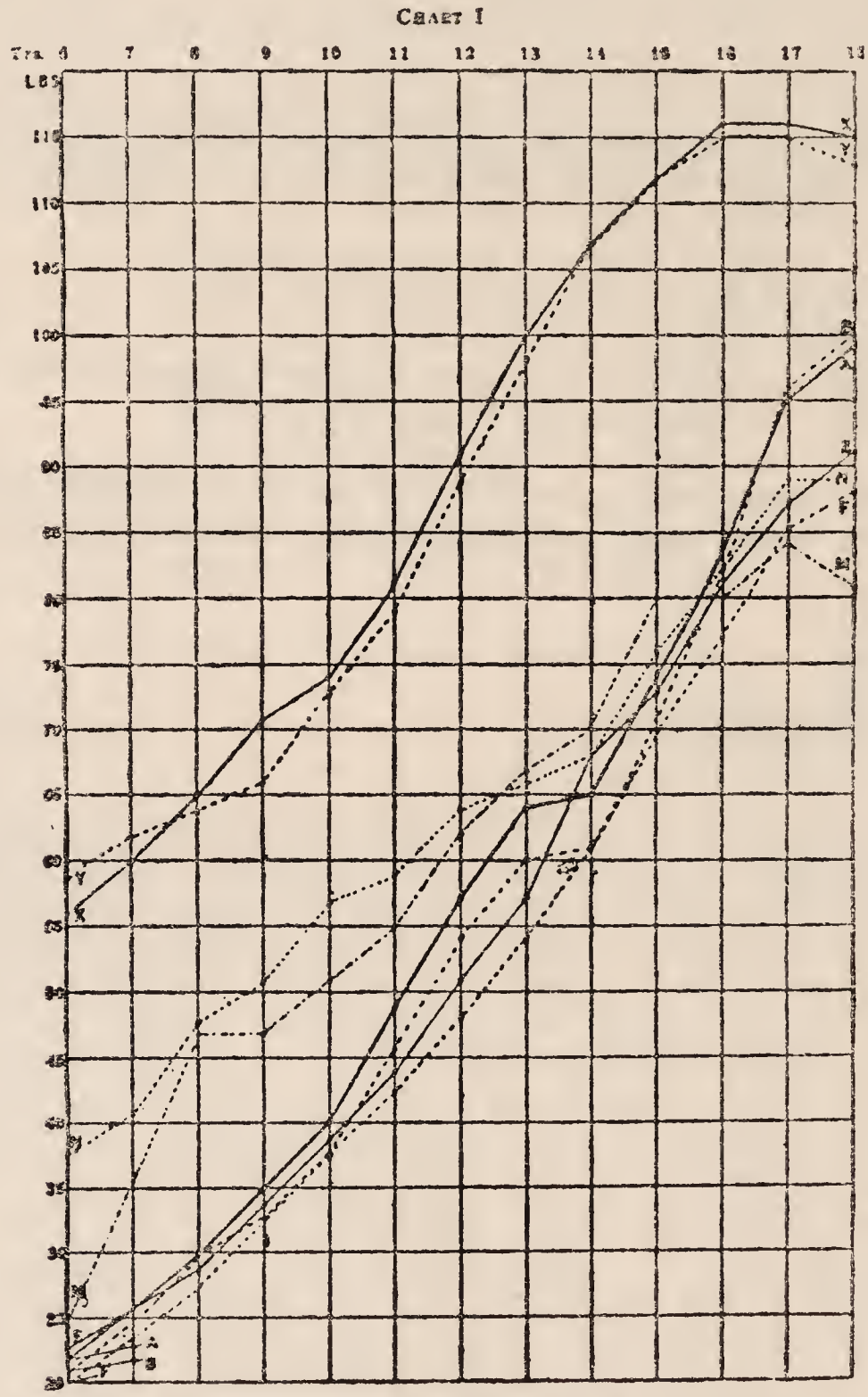


Fig. IV. From the *Denial Cosmos*, June, 1917.

the biting pressure on the molars right and left of 130 boys with normal dentures; the two curves A and B were the hand-grip pressure of the normal denture children; curves M and N were the jaw pressures of the children with the abnormal dentures, (about 230 children), and curves E and F were the hand grip of the abnormal children. It would be seen that there was a definite relationship between the different pressures. Although the hand

grip was not very much lower than the normal hand grip there was a difference of several points.

The next slide showed the hand-grip dynamometer. It was an illustration taken from Johnson's paper of Smedley's hand-grip dynamometer. The advantage of that instrument was that the relationship between the hand pieces could be altered so as to accommodate different sized hands.

The next illustration (Fig. V) showed the jaw dynamometer. Two lead bite blocks were fitted on to the ends of the steel levers at A and A1. New blocks were used for each test. The instrument registered up to 130 lbs.

The next illustration (Fig. VI) was that of a very embryonic instrument for the purpose of testing the strength of the tongue, but it would only test it in one direction, the pressure of the tongue towards the hard palate behind the upper incisors. The teeth pieces or blocks A and A1 were held firmly between the teeth, and the tip of the tongue was pressed against the tongue piece B, the maximum pressure was recorded on the dial. The tongue was an extraordinarily difficult organ to test or measure in any way, but possibly this instrument would be useful.

The next drawing was that of a lip dynamometer (Fig. VII). The teeth were held together and the two removable lip pieces A and A1 were placed between the lips, and the child exerted the maximum pressure between the lips and the pressure was recorded on the dial.

It was possible that those methods might be of great help in coming to a correct diagnosis of cases of malocclusion.

The next illustration (Fig. I) was one side of the chart of which he had spoken; this particular chart was filled up for a child that he examined in one of the hospitals in Vienna.

Where possible he endeavoured to get the diet of a child from infancy to see whether the diet for the first six months was natural, artificial, or mixed, and also the nature of the artificial food, and finally the present diet of the child. If a parent was asked what the child's present diet was no very satisfactory answer was obtained, and he thought it was better to ask the parent to write down everything the child ate for a week and the quantity, which gave a much better idea of the type of diet. The form of breathing, whether affected by adenoids or enlarged tonsils, and information with regard to habits and diseases, were all important.

With regard to the oral conditions, he thought it was important to note whether any developmental defects of the enamel were present, such as hypoplasia or white patches. For that purpose he had a chart (Fig. III) on which he marked the extent and form of hypoplasia or white patches and the affected teeth.

The next illustration (Fig. II) showed the other side of the chart. It was important to note the general condition of the mouth, whether it was clean; to note the state of the gums, whether there was inflammation or recession of the gums, and to note the extent and type of caries. With regard to the oral conditions, it was important to note the date of the eruption and loss of the permanent and temporary teeth. It was difficult to obtain any information as to the date of the eruption of the teeth, and all one could do was to mark down the age of the child, what teeth were present and

what teeth had been prematurely lost, that was to say, whether temporary teeth had fallen out prematurely without their successors appearing. The particular child on the chart has very bad rickets. She had her two first permanent molars present and no other upper teeth at all. In the lower jaw she had the two first permanent molars and a deciduous canine and lateral on one side and a canine on the other side present.

With regard to occlusal conditions, besides the use of photographs and models there was a large number of instruments used for determining the amount of drifting of teeth, usually following premature losses, instruments for determining the amount of growth forward of the arches, and instruments that were used for predetermining the shape of the arch. With regard to the instrument used for determining the amount of drifting and direction of drifting, there were such instruments as the prosopometer, which measured the distance from the external auditory meatus to any particular teeth, and showed whether one tooth had drifted in a particular direction in relation to the similar tooth on the other side. It was a difficult instrument with which to get accurate readings, on account of the looseness of the external auditory meatus in the living subject, and he had not had very great success with it. The second instrument was Grünberg's symmetroscope (Fig. VIII), an instrument for determining the symmetry and asymmetry of the arch. The model was inserted within an isosceles triangle and, according to Grünberg's instructions, the line which bisected the apex of the triangle must pass through the central incisors and the side lines which formed the apex must touch similar points on similar teeth, and then any line that crossed the perpendicular line at right angles would show whether one tooth was on the same level as the similar tooth on the other side. There were some faults in the instrument, two of which were very important, but they could be remedied. One occurred in cases where the centre, between the central incisors, had drifted to one side. In the diagram (Fig. IX) T and T1 represented the molars and premolars in normal position. C represented the centre, between the central incisors, but had drifted to C1. In order to carry out Grünberg's instructions of having the centre line (90° line) passing between the central incisors and the side lines touching similar points on similar teeth, the model would have to be twisted so that the centre line (90° line) was no longer in or parallel to the medium plane of the jaw, and one would get an apparent drifting forward of the teeth on one side.

The second type of case where an incorrect reading was obtained was where one side was in lingual occlusion, but the centre, between the central incisors, was normal. Diagram (Fig. X) showed the molars and premolars T and T1 in normal mesio-distal relation but T in lingual occlusion. The centre C normal. In this case it was impossible to have the 90° line passing between the central incisors and not to twist the model so as to have the side lines touching similar points on similar teeth. The carrying out of Grünberg's instructions would lead one to believe that T had drifted forward to T11. If it were possible to move in the side line parallel to the lingual occlusion of the teeth, as in Fig. XI, it

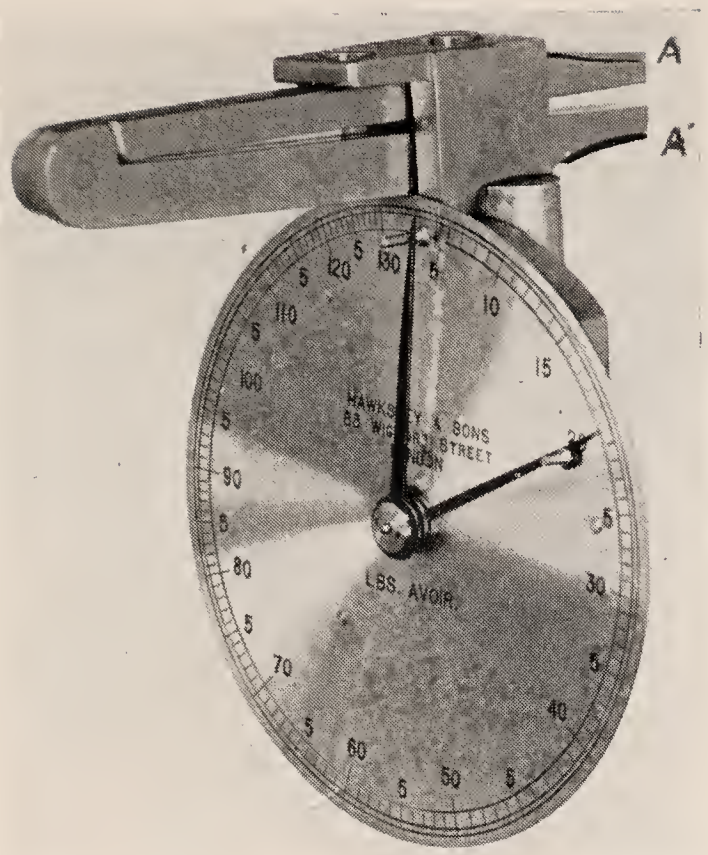


FIG. V.

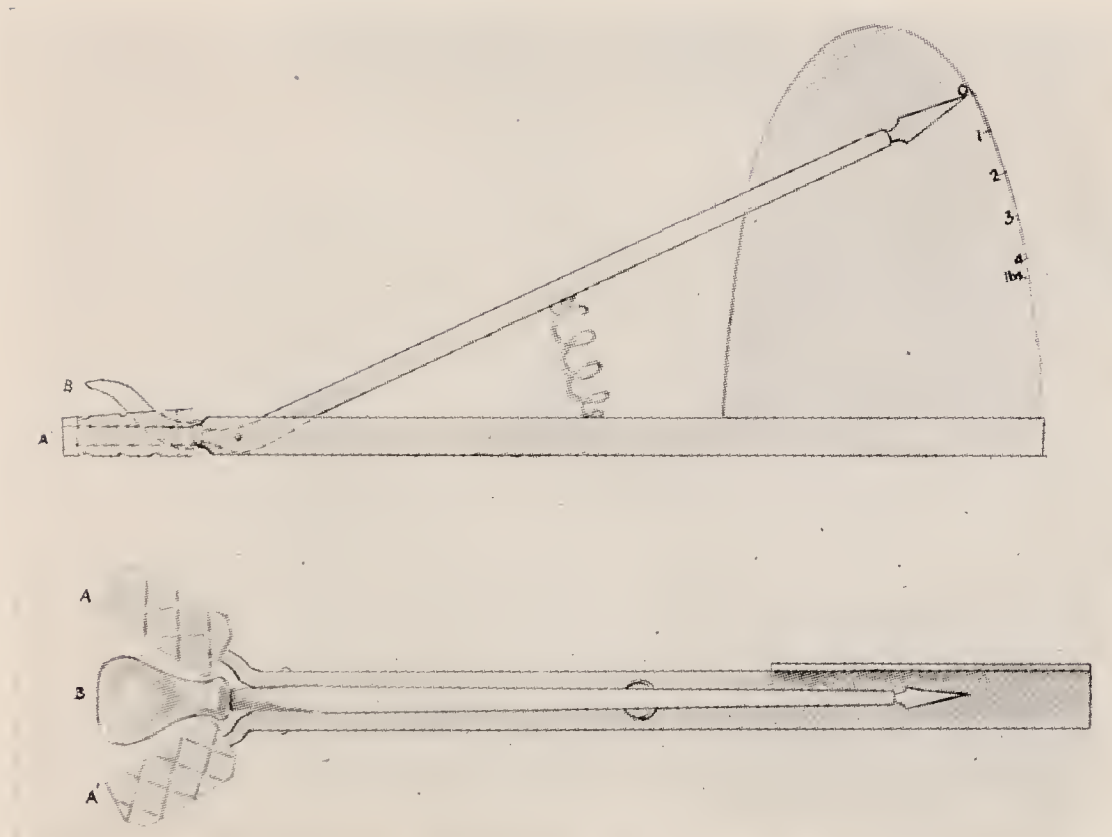


FIG. VI.

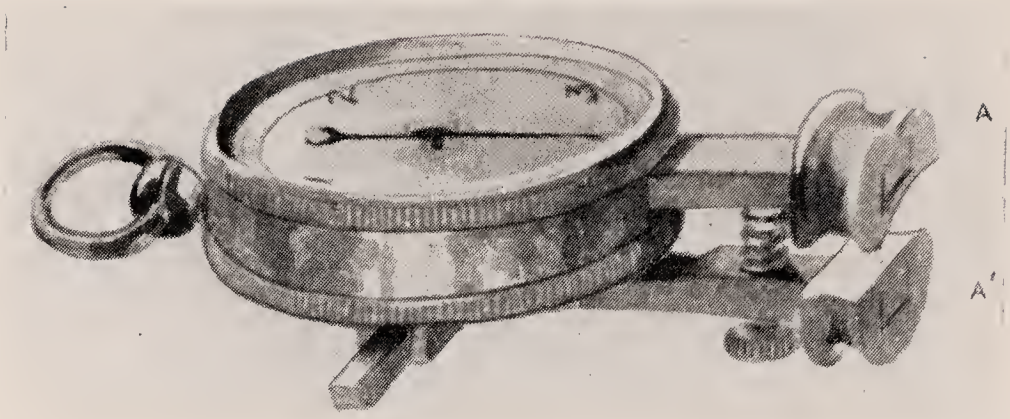


FIG. VII.

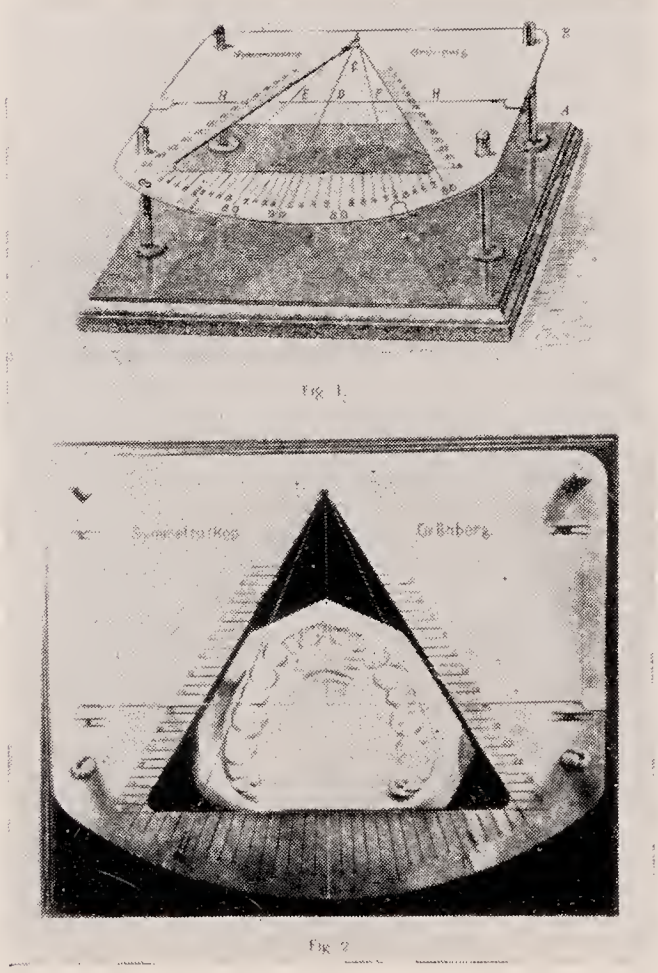


FIG. VIII.

From the "Oesterreichisch-Ungarische Viertiljahroschrift für Zahnheilkunde."

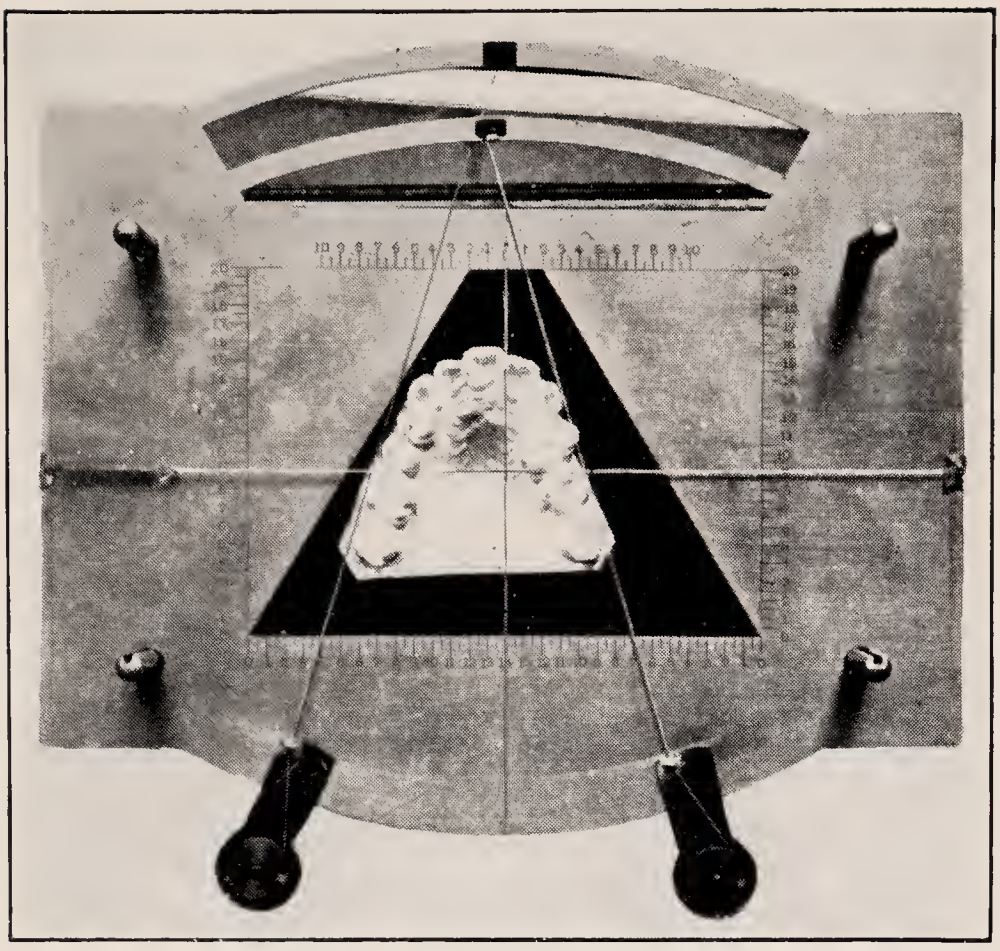


FIG. XII.

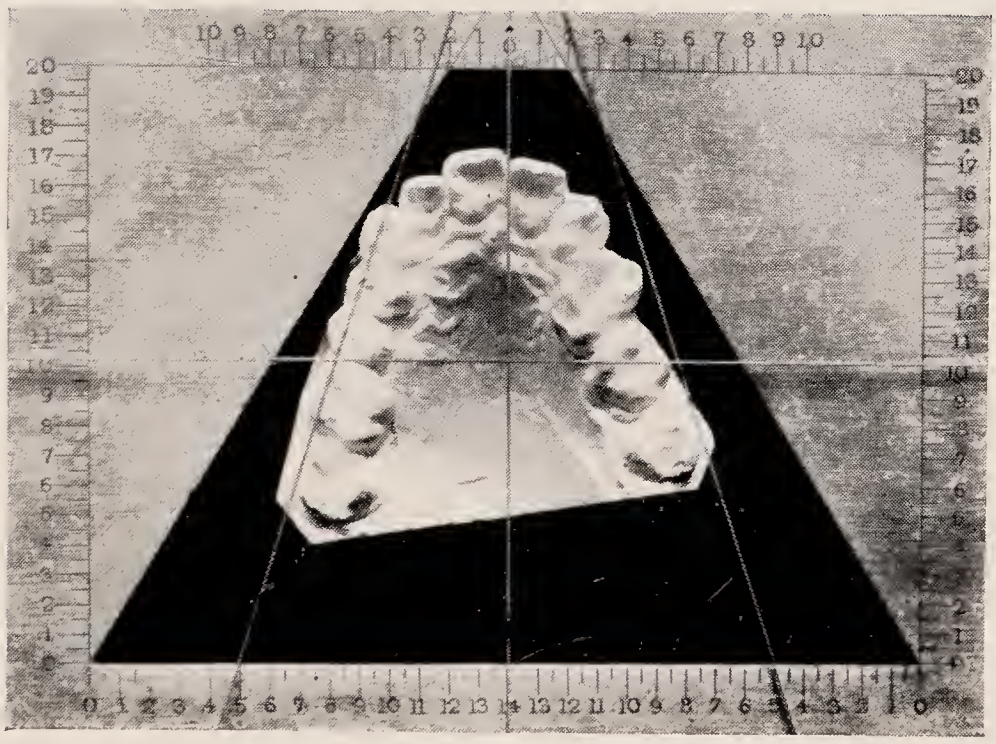


FIG. XIII.

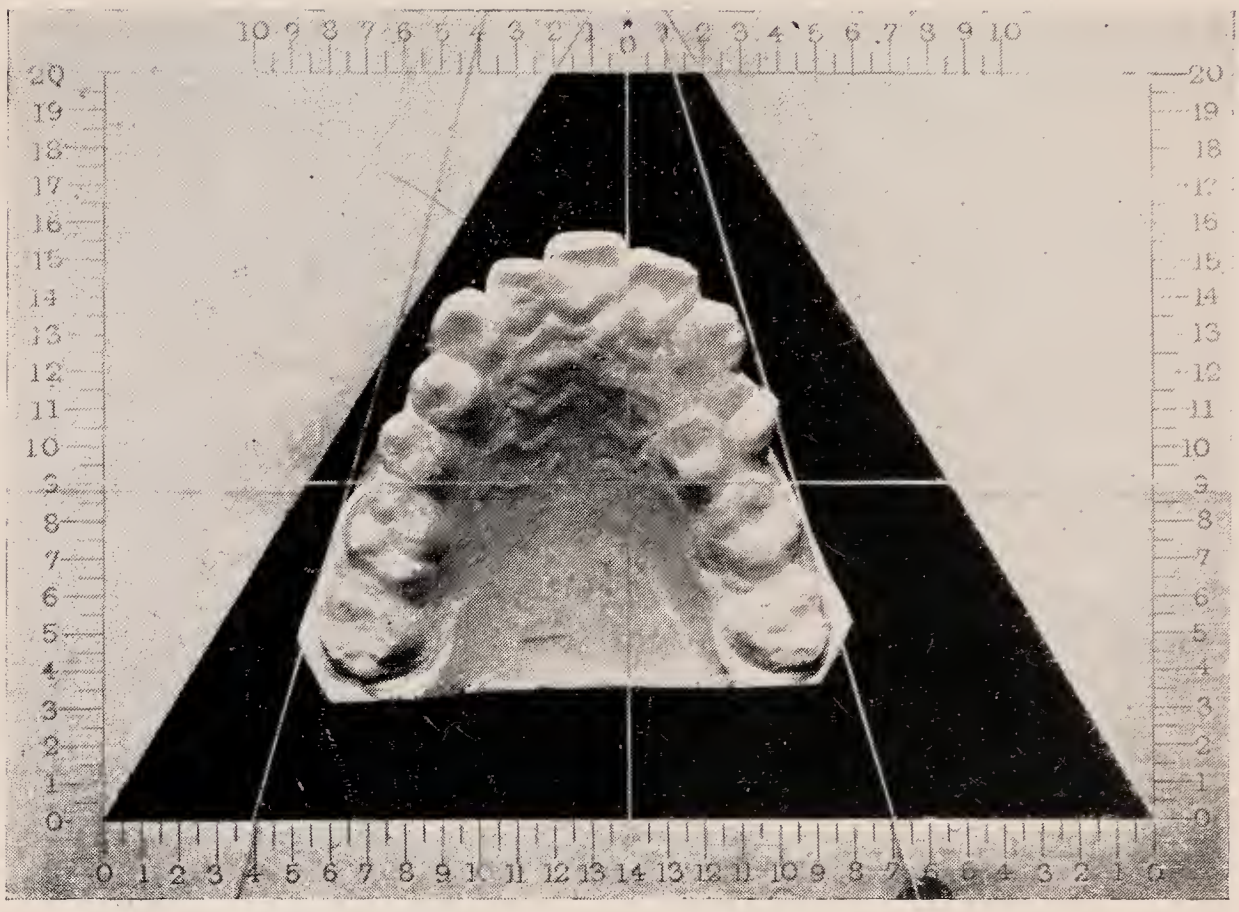
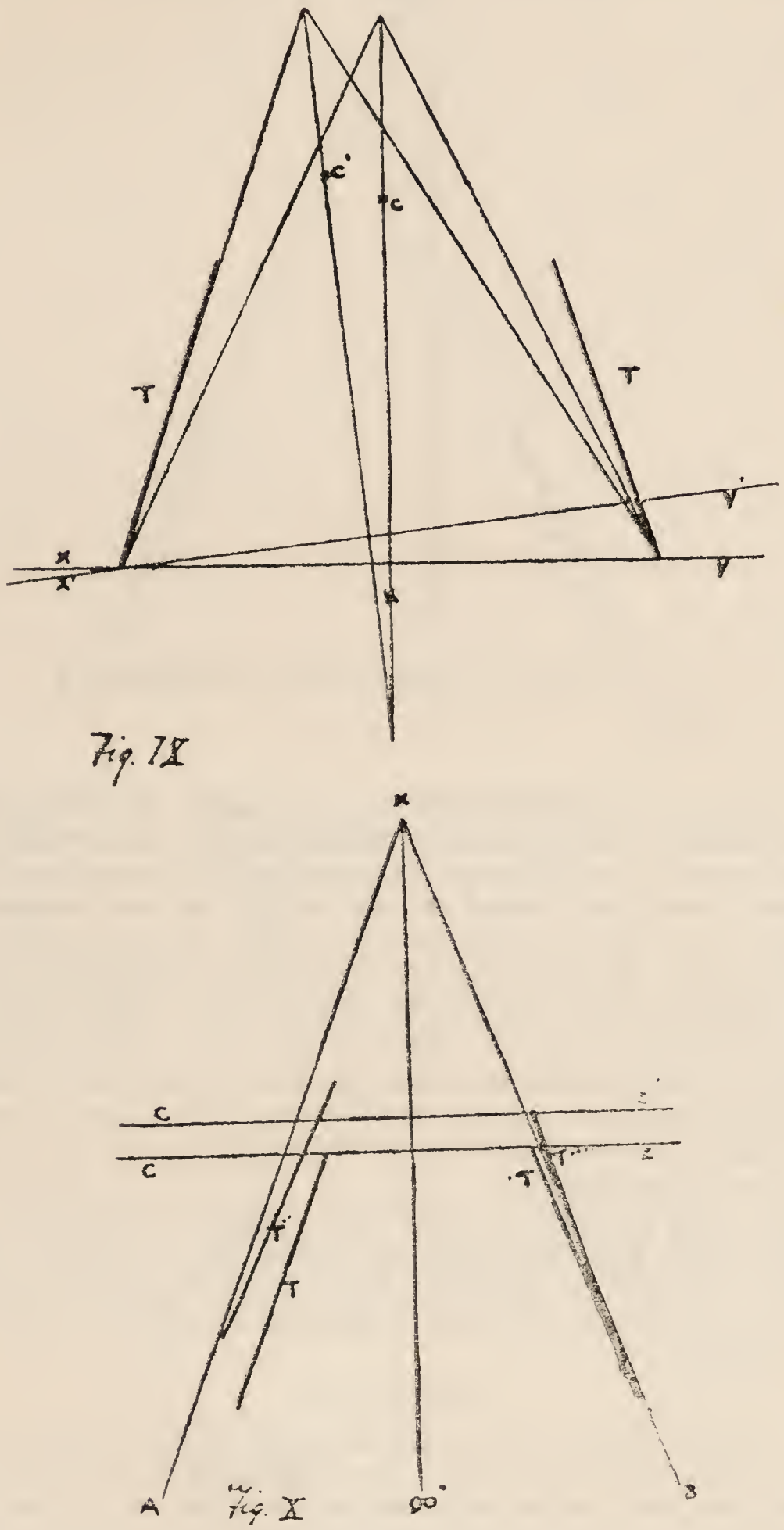


FIG. XIV.

would then be possible to obtain a correct reading in both these types of cases. Fig. XII illustrated the modified symmetroscope and Figs. XIII and XIV illustrated the difference of the reading



with Grünberg's symmetroscope and the modification respectively in one case.

The second class of instrument for showing the amount of growth forward of the jaw was the prosopometer, but it had the same disadvantage he had mentioned before.

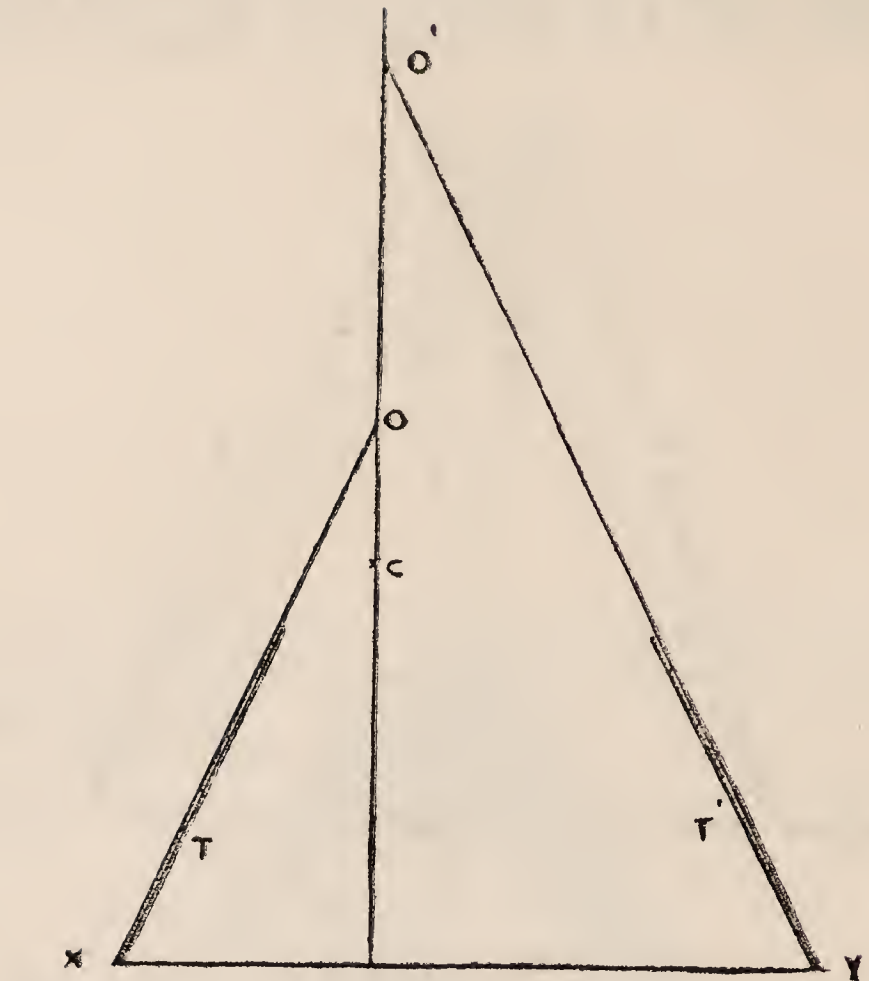


Fig XI

Instruments for predetermining the shape of the arch were Hawley's charts and Stanton's odontographs and various other instruments, which could be seen mentioned in American journals. They were nearly all based on the width of the various teeth, Hawley's charts being based on the width of the centrals or the combined width of the centrals, laterals, or canines, and from that he predetermined the shape of the arch. There was a good deal of controversy as to the value of those particular instruments, and such writers as Hellman threw great doubt on their usefulness. He (Hellman) was not able to predetermine the shape of monkeys' arches, and little proof had been brought forward in support of the different instruments.

He had only touched on the very fringe of diagnosis, but in conclusion there was one point he would like to make, and that was that it might be of more importance to study the bodily conditions rather than the mere plaster cast in order to arrive at a correct diagnosis.

Discussion.

Mr. J. Sim Wallace said the paper might apply in many ways not only to diagnosis but to etiology. The etiological part in which he was interested was the general condition of the child, which he believed was associated with a general tendency towards irregularities and the lack of power in the muscles. He believed his own jaw was once more or less normal, and it used to be a trick of his with other students at the University to test his grip, and he remembered that he could always put the dynamometer higher than the others. He could only congratulate Mr. Friel on having brought diagnosis a stage further and a stage more accurate than it had been in the past.

Mr. J. Lewin Payne said he felt hardly competent to discuss the particular instruments and methods that had been presented that evening, but he had to congratulate Mr. Friel upon the work which he had been doing and to thank him for bringing forward this new information. He would like to enlarge, if he might do so, the scope of the discussion in regard to diagnosis generally. As Mr. Friel had already said, it was a very important phase ; it was the most important of all phases in practice, and at the same time from the point of view of the orthodontist it was probably the most difficult. The question might be asked as to how a diagnosis was made. It was a complex and not a simple process and it really depended on three things : first, personal observation ; secondly, physical examination, and, thirdly, a clinical investigation. In making a diagnosis of any general condition the surgeon must begin by inquiring about symptoms and the length of time those symptoms had lasted and the order in which they appeared ; he found out something concerning the patient's constitution, mode of life, and family antecedents, and that information constituted the history. Mr. Friel's charts had well indicated the way in which that branch of the subject could be approached. Then with regard to the physical examination it was necessary to look carefully at the region to which the trouble was referred, and at the same time consider the condition of all surrounding parts, and sometimes parts remote from that to which attention had been called. In that physical examination the observer took into account what he saw, what he felt and what he heard. The diagnosis was usually made from the information derived from those three sources ; but if there was still any doubt the inquiry could be followed up by means of clinical investigation, and so in the consideration of orthodontics personal observation, physical examination and clinical investigation should be the line of procedure in dealing with such deformities. But before an adequate diagnosis of abnormal conditions could be made, it was essential to be absolutely familiar with that which was normal, to know the shape, size and movements of the jaws and arrangements of the teeth, and also to have intimate acquaintance with the method of growth and classification of the jaws and of the other bones upon which they particularly depended. Moreover, in order to obtain an accurate discrimination it was essential to have a satisfactory classification of the various types of deformities. It had been truly said that a comprehensive classification was the chief problem at present in connection with the subject. Without in any way disparaging the excellent work done in that direction, it was impossible to say that there was at present an entirely satisfactory classification for malocclusions of the teeth. Many classifications had been suggested, and it would be possible to quote at least a dozen that had been presented to orthodontists during the last half century, but nearly all of them had been based on pathological manifestations, and, until the cause or causes of malocclusions of the teeth had been discovered and it was possible to formulate an etiological classification, it would be necessary to rest satisfied with something less than the best and to accept a classification constructed upon the nature of the deformities. Such a paper as that which was read before the Society last December by Professor Sir Arthur Keith and Mr. Campion was of the greatest assistance in guiding thoughts in the right direction. In the past he was afraid most orthodontists—and he would specially include himself—had treated the cases quite empirically, without making any serious attempt to make an accurate diagnosis. He trusted those days were gone, and he would urge that every endeavour should be made to find a classification based upon etiological factors and that most careful study should be given to the normal conditions and the earliest deviations from those normal conditions, and then, by personal observation, physical examination and clinical investigation of each individual case, it might be possible to arrive at a correct diagnosis which would greatly aid, and in all probability would greatly simplify, the treatment.

The PRESIDENT said he had been very interested in Mr. Payne's extension of the term " diagnosis," because he had carried the subject further. As put on the agenda, it seemed rather an indefinite term to use, and he had been thinking of the way in which diagnosis in other matters was sometimes brought about. Symptoms not found in the case were ticked off one after another and a diagnosis was arrived at by the negative method known as exclusion, so that the practitioner was driven more or less empirically to say that it must be something else.

Mr. PITT was particularly interested in what Mr. Friel had to say about the importance of noting the bodily condition, because he believed that was a thing of great importance. Many of the most marked cases of malocclusion were intimately associated with disordered functions, and chief amongst them was the disordered respiratory function and a large number of them was associated with adenoids and mouth breathing. It was important to remember that the effect of that on the teeth brought three or four factors into operation on the malocclusion. There was the absence of normal nasal respiration and its effect on the occlusion ; then there was the positive factor in the shape of perverted mouth breathing ; there was the lower nutrition, which was so frequently associated with such cases and which affected all the processes of growth ; and through that there might be possibly some abnormality of the internal secretions. He only put that forward tentatively. He had noted in many cases of mouth breathing how frequently the nutrition was impaired and how very often, when the adenoids had been removed and the mouth breathing only persisted as a habit, by checking that the bodily nutrition could be improved, and he believed with Mr. Friel that attention to the bodily health might be as important as anything in the treatment of cases of malocclusion. With regard to Mr. Payne's remarks, there certainly ought to be an attempt to get a classification based on etiology.

Mr. H. CHAPMAN thought from what the various speakers had said the matter of diagnosis was an extremely complicated one and, bearing in mind the paper read last December when Professor Keith described a very large area of the face as the " masticatory face," it seemed that that also had to be taken into very serious consideration in any disgnosis that was made. This had been more than emphasised by the fact of the necessity of taking into consideration the whole bodily condition. It would be perhaps made clearer how such things worked if orthodontists kept nearer to the teeth. If the jaws were really malformed bones, then all the bones articulated to them must be also malformed and had to be taken into consideration in the diagnosis, and as the diagnosis was for a practical purpose it would be necessary to consider the malformation of that area (the masticatory face of Keith) in the treatment prescribed. For that reason in many cases, more especially where the patients were 12 years of age and upwards, the retention of all the teeth was a matter that required very grave consideration, and he had himself to confess to having in such circumstances treated several cases recently by the method of extraction, whereas ten or fifteen years ago he would have treated similar cases by retaining all the teeth. The instruments that had been shown that evening were extremely ingenious and valuable, but, as Mr. Friel had pointed out, they had to be used with a very great deal of care and judgment, because there were so many factors entering into the matter that to get a proper result the instruments had to be adjusted to the various conditions present, and to do so correctly depended on the judgment of the operator. By using the symmetroscope in one way it permitted the molar to appear to have come forward, and by using it in the way Mr. Friel said was correct the molar was practically in its normal position. In all cases it was necessary to use whatever aids were available and a considerable amount of judgment to arrive at anything like a correct decision. It was a very complicated problem. One had to consider the relationship of the teeth to one another in each jaw, the real

relationship of the teeth to one another in opposite jaws, the relationship of the jaws to one another, the relationship of the jaws to the face and the relationship of the face to the whole of the body, and he felt sure that Mr. Friel's communication, for which he was very grateful, would materially assist in elucidating the problem.

Dr. SYLVAIN DREYFUS, of Lausanne, sent the following contribution to the discussion.

In his original paper Dr. Dreyfus discusses in an exhaustive study the horizontal planes of orientation, and follows this by a proposal to adopt the plane of Francfort, which is determined in the following manner :—

1. The first fixed point selected is the superior auricular point, that is the upper edge of the external auditory meatus (on the living subject the anti-tragus).

2. The second point is the inferior orbital point, that is the point of the orbit which is on a vertical line passing through the pupil.

The line joining these two points is the plane of Francfort.

With the adoption of the principle that it is not necessary to determine an ideal line, Dreyfus determines the limits of the abnormal; then, between these limits everything will be normal. This method of examining cases permits us to take into consideration the particular type of each. For this purpose he proposes two vertical planes, the orbital plane of Simon, which he would prefer to call " the frontal plane passing through the border of the orbit " and a second plane passing through the nasion (the suture of the nasal bones with the frontal bone).

The facial diagnosis is made according to the following data :

If the chin is between the two planes, the mandible is normal, if it is behind the first, or in front of the second, we have respectively retrognathism or prognathism of the mandible. For the maxilla the diagnosis is as follows :—

1. The plane of Simon, normally passes between the canine and first premolar.

2. The plane Sylvain Dreyfus, i.e. the one passing through the nasion, passes along the anterior surface of the upper incisors.

With these two planes as the fixed points diagnosis of facial malpositions can be made.

The author showed the application of his proposals by means of photographs of the patient, a transparent positive on glass being superimposed on an exactly similar photograph on paper, except that the positive on glass was taken with the mouth open; otherwise the pictures were identical; the planes referred to were drawn on the print and by superposition the relation of the upper teeth and chin to these lines was readily seen.

Dr. Dreyfus points out that the region of the molars may be normal, and that the abnormality is then found in the anterior part of the maxilla only.

The author sent his " Facial Diagnoscope " to illustrate a rapid method of making the diagnosis according to the principles enunciated above, without the assistance of photography. The principle of the diagnoscope is to locate the three lines referred to exactly and in correct relation to one another, and then the relation of the teeth and chin to these lines can be seen at once.

This is the first time that an exact method of making a diagnosis in the sagittal direction has been brought forward. It enables us to conceive a basis of classification for maxillary malpositions based on their relation to the facial profile.

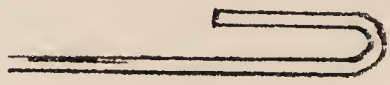
Casual Communication by Mr. EDWARD PITT, " The Ainsworth Appliance."

The apparatus I show has been known for some time as the Ainsworth and it is a very simple and very effective apparatus, but it has to be somewhat carefully used. I think I can show you one or two pitfalls into which anyone using it at first is likely to fall. The idea is very

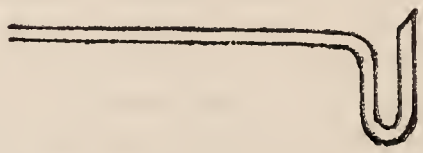
simple. There is a band with a vertical tube on it and arches made with very thin wire.

The chief difficulty was to get the loop in proper proportion and make it stay in the tube. To do that you cut the tube off after bending the arch and file the end of the arch as shown in the sketch, and then it

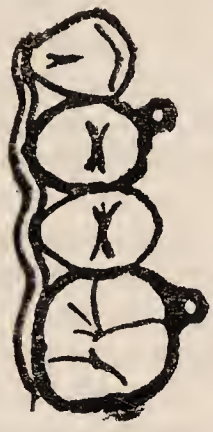
Lower Molar tipped to lingual.
Tubes must be placed almost vertical.



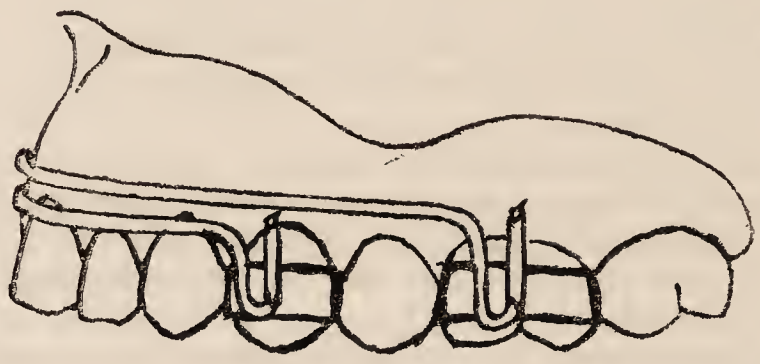
First bend in arch.



Second bend, end filed.



Occlusal view, showing first premolar and first molar banded with spur to canine.



Buccal view with arches in place

will stop in. There are two ways of getting the spring on, as will be seen by the models. The first way is by opening the arch in the ordinary way, but the principal method is to bend the vertical piece outwards, which can be done very easily, so that, when the arch is put into one tube again, instead of lying straight it will be hanging down. If you get the arch pressing too much on the front teeth it will ride up and do a lot of damage in a week, so that unless you want to move the anterior teeth back at the same time as expanding the posterior part, it is best to leave the arch a little way from the teeth. In expanding from the molar to the first premolar the best way is to make the bands, put them on and take impressions. I always bend the arches in the mouth, because they fit better. The mere bending of the arches on the sand and plaster model will break the model up. The main idea of the vertical tube is to get movements of the root. If the bending outwards is not done on the vertical part there will be no movement of the roots, and if the tube is fixed too much in the front and the tubes are not really vertical you can tip the teeth either way much more easily than would be imagined. One of the difficulties has been to get a good metal for the arch. Iridioplatinum can be used, but I have been using lately ordinary phosphor bronze, which can be got from any engineers and which retains its spring so long as it is not heated. In first bending the arch a straight piece of wire is used, and it has to be pretty good wire that can be bent as shown in the sketch and retain sufficient spring. The second bend is also made as shown in the sketch. I have one or two results to show. In one of them the anterior teeth were moved afterwards. No ligatures have been used on the teeth. In the other case the teeth did not require that movement. In the lowers there are one or two difficulties which can be easily got over, one of the chief being the buccal slope of the lower molars.

The molars are rather tipping towards each other and when you get the vertical arch as shown in the sketch it springs out again. The only thing to do was as shown in the sketch. The tube must be kept more or less clear of the gum. Once it has been done I think it will be found very simple and the apparatus can be left for a long time, for three weeks if necessary, without seeing the patient, and that is sometimes a great convenience. The only thing to be careful about is that as the arch springs at the sides it shortens in the front. I had one case left for three months and when the patient came back the arch could not be found as the gum had grown all over it.

Mr. Pitt exhibited several models illustrating his remarks.

Mr. GEORGE NORTHCROFT felt that the members of the Society required to cultivate the art of expansion in speech as well as the art of expanding arches, but he could not let the occasion pass without congratulating Mr. Edward Pitt on the presentation of his case. Undoubtedly the Ainsworth Arch had its place in the treatment of suitable cases, and the members were very glad to be reminded of its uses once more.

Mr. HAROLD CHAPMAN asked whether the burring on the end of the arch had to be done each time that it was withdrawn from the tube and replaced.

Mr. PITT said the arches did not last very long as a rule, and it was best to make a new one, an operation which took but a very few minutes. After having sprung the arch once or twice he threw it away and made a fresh one, but if it had only to be done once or twice there was no need to do it again.

The PRESIDENT thought there had been very suggestive remarks made that evening and he hoped they would result in good later on.

A vote of thanks was accorded to Mr. Pitt for his Casual Communication and to Mr. Friel for opening the discussion and the thanks of the Society were also tendered to those who had taken part in the discussion, and the meeting then terminated.

AN Ordinary Meeting of the Society was held on March 6th, Mr. P. Sidney Spokes, President, in the chair.

The minutes of the previous meeting were read and confirmed.

The following signed the obligation book, and were admitted to membership: Miss Iago, Mr. Harborow and Mr. Skipper.

Mr. S. Holloway Olver, L.D.S.Eng., and Mr. Edward Almond Jennings, L.D.S.Eng., were elected members.

The discussion on "A CONTRIBUTION TO THE MECHANISM OF THE GROWTH OF THE HUMAN FACE," by Professor Sir Arthur Keith and Mr. George G. Campion was resumed.

Prof. JOHNSTON said the subject was a very large one and had been discussed from several points of view. The association of the gradual change in the type of face with the presence of an arched palate, was a point of considerable importance, but in comparing the different types with one another the authors of the paper had not clearly laid down that they accepted a standard for the palate of a child at a given age, a standard for a normal adult palate, and a standard for an arched palate, and as a result he thought there were some difficulties in the diagrams, although that might be the fault of the artist. For instance, when the arched palate was compared with a normal palate, there was an evident down-turning of the anterior nasal spine in the former, but when the child's jaw was compared with a normal adult there was only a

slight rise in the nasal spine, and when it was compared with the arched palate of the adult there was a greater rise in the nasal spine of the arched palate than in the case of the normal jaw, and he could not see personally how these differences could be harmonised. In comparing the child's jaw with the adult jaw there was the consideration as to orientation. In one of the superpositions the second molar was super-imposed on the first permanent molar, whereas in another illustration it was on the second premolar and overlapping the first permanent molar to a very slight extent. With regard to the standardisation of the arched palate type of skull, in the first illustration the alveolar border was very much longer than in the normal palate, but when two skulls were to be compared to show the marked narrowing at the base the arched palate was very much shorter than the normal. Therefore, to compare those things some sort of a standard was required. He had no doubt that Sir Arthur Keith had a standard in his own mind, but he did not think he made it perfectly clear which standard he adopted, or whether he had a varying standard which he applied according to certain given conditions. The narrowing at the base of the skull in association with the arching of the palate was explained chiefly as being due to cessation of growth of the temporosphenoidal articulation, and one would like to know why he excluded the petrous part of the temporal bone and the basilar parts of the sphenoid and occipital from sharing in that diminished growth. The point on which he laid stress was that mouth breathing had very little to do with the association of adenoids and tonsils, which was rather an associated condition than a causative one.

Sir ARTHUR KEITH said the criticisms of Professor Johnston were very much to the point, and he should like to enter into them in a little detail, but he should like before doing so to remind his hearers that the paper just published was merely a preliminary one. It was simply an attempt to make the first outline of what the authors considered ought to be the basis of a knowledge of dental anatomy. When all was said and done, one did not want to know so much about the dead anatomy as about the growing and living anatomy, of the face especially if we are to discover the circumstances which lead to a deficiency or abnormality in its growth. It seemed to them that the first thing was to work out where growth actually takes place. Their paper was far from a complete treatment of the subject : it was simply a feeling of the way. From the point of view of text books, knowledge had been advanced a little more, for until now attention had been confined to mandibular growth. It had to be admitted that the knowledge of the growth of the lower jaw was very good, but with regard to the upper jaw, especially of the face as a whole, our knowledge is defective. The mechanism by which they grew and where new bone was laid down, had not been looked into very closely. With regard to the provisional standard of normal development, he had taken an average English skull as a guide. There was a large collection of children's skulls in the College of Surgeons, and he had selected what he thought were representative children of successive ages. It was still necessary to work out means or standards for these ages. It would be seen in the illustrations published that he had used three different cases of contracted palate, and there

was not the same kind or degree of contracture in any two cases. His experience of contracted arches was that, taking the incisor teeth as a basis of measurement, when he superimposed the contracted arch on that of a normally developed adult skull the third molar of the contracted arch was thrown behind the position of the third molar of the normal arch. That was a point which Mr. Campion had questioned, and one which was open to criticism. He believed that in adenoid cases with contracted palate, the wisdom teeth were actually further back than they were in normal skulls. It would be found he believed that the permanent molar teeth in contracted palates were situated half a tooth or even a whole tooth behind the normal position. Another point which was questioned by Professor Johnston was the depression and elongation of the premaxillary region in contracted palates. This was the conclusion reached from the examination of a long series of skulls. He had compared about fifteen contracted skulls with fifteen normal ones and found that there was a narrowing in the nasal region, and it was this constriction in width which gave a very long and narrow face in adenoid people. The cause of contracted palate was most important, and behind our inquiries lies the possibility of introducing measures for remedying it. He believed that in a contracted palate there was no change in the level or position of the floor of the nose. What actually happened was that the hard palate was approximately at its normal level, but the alveolar arch was deeper. The vaulting of the palate was not due to the bending of the roof of the palate at all but to a different—more vertical—deposition of the alveolar bone of the palate. His study of the face had led him to the belief—a belief used in practice since dentistry was a science—that the alveolar element in the jaws was quite different in nature from the rest of the bone. The alveolar bone in which the teeth are mounted and fixed is completely absorbed when teeth are extracted. In all orthodontic operations the alveolar bone proved to be far and away the most plastic of all the elements of the face and most susceptible to all the influences that could be brought to bear on the bone, whether these influences are mechanical, such as chewing, or biological, such as are produced by hormones.

Professor Johnston said he wanted to bring out one point particularly in connection with the depression of the anterior nasal spine. In Sir Arthur Keith's comparison from the interior view, the child's skull was so superimposed, allowing for the 4 mm. of growth, that there was a very slight rise in the region of the anterior nasal spine, but when he compared it with the facial view of the contracted palate there was a very much larger growth and he did not see how those views could be brought into harmony.

Sir Arthur Keith said they were two different cases of contracted palate and that was rather an exceptional one.

Mr. W. Rushton said the general belief was that the roof of the palate was raised in cases of contracted arch, and in consequence of that people had been taught to believe that that was the cause of deflected septa, and he should like to know whether there was any foundation for it.

Sir Arthur Keith said his interpretation of the deflection of the septum was different. Anyone who had studied skulls would admit that there had been a very great reduction in the size of the jaw, and

in the distance to which the jaws grew in a forward direction. The bending of the septum of the nose was not due to a failure of the palate coming down but a failure of the forward growth of the face. A retraction of the forward growth of the jaw limited the normal growth of the septum. He sketched on the blackboard a sphenoid bone and showed the position where the deflection of the septum always took place. He pointed out that the vertical plate of the ethmoid was bent at an angle as shown in the drawing. It did not seem to him a failure in the vertical growth but in the forward growth, which he took to be due to the same cause as an adenoid contracted palate, a failure of the forward growth of the palate.

Mr. J. G. TURNER asked whether the upward and forward movement of the nasion demonstrated by Sir Arthur Keith would not compensate for the loss of room consequent on the backward position of the palate?

Sir ARTHUR KEITH said that ought to be a compensatory movement. He always supposed that the nasion must grow forwards and downwards and it was only after examining a large series of skulls that he found the nasion in the child moved forwards and upwards half an inch before the adult stage was reached. In the gorilla there was a corresponding movement of one and a half inches.

Mr. TURNER said Mr. Campion's measurements were rather few, too few to allow of any certain deduction. The authors, arguing from the reversed variability of the transmeatal-incisor and transmeatal-nasion axes in later youth, had inferred that some growth factor had come into operation in the transmeatal-incisor axis which had increased its variability. Not only were the numbers few but the fixity of the cartilaginous parts of the external auditory meatus was doubtful, and there was a very common factor in present-day life which would lead one to expect a greater variability in the transmeatal-incisor axis in later youth. Between the ages of 12 and 20 large numbers of upper first molars and of bicuspids were extracted and the result always was a pushing backward of the more anterior teeth by the compressing power of the lips and cheeks. There was then no question of a new growth factor; it was only that some transmeatal-incisor axes were shorter than they could have been. The measurements must be made on uninjured dental arches.

Mr. CAMPION said they were so measured in the cases mentioned.

Mr. TURNER said that the authors claimed to have shown very considerable growth at the palatal suture, but there were some facts which seemed to set a limit to that claim. From the time of eruption to the time of shedding, the temporary teeth of a normal growing child were being carried forward and outward into a larger arch with a resultant separation of all the teeth, including the molars. The separation of the central incisors was small, perhaps about 2 mm., and the permanent incisors took their place once and for all and were never further separated. That then was the limit of growth at the mid-palatal suture in the anterior part of the maxilla. The movement of the lateral incisors from their developmental positions behind the centrals suggested that a further increase was accounted for by growth at the small radiating

sutures at the front part of the maxilla, and the general separation of all the teeth of the temporary arch pointed to an addition of bone on the whole outer surface of the maxilla, while the fact that the permanent canine found a place in the arch showed that room had been made for it, at least in part, not by pushing aside the maxillæ at the midline but by additions on the outer side. If that reasoning was correct the authors had made a mistake in superimposing tooth on tooth in Fig. 16. The alveolar portion of the child's maxilla was destined to undergo considerable outward expansion and should be superimposed much nearer the midline. He believed Tomes' original statement still held, that the dental arch of a child of six corresponded very closely to the arch of the teeth of succession. He found that the first permanent molars, erupting during the sixth year, were never carried further apart, nor were the second permanent molars, erupting during the twelfth and thirteenth year. At thirteen years the size of the whole palate was fixed and most of it was fixed by the age of six. The authors had made a great addition to the knowledge of the anatomy of the adenoid face but they were far from proving that there was no mechanical factor in the case, and neglect of such a factor seemed to him to have led them astray when they said the alveolar element of the maxilla, instead of expanding laterally, had spread downwards. That direction was a direction imposed on the alveolar elements by the lateral pressure of the cheeks, stretched by the open mouth. That there was such a pressure was proved by the crushing together of the remaining teeth after extraction of one or two in young life. That it was due to the cheeks in turn was shown by its absence in cases of early one-sided facial paralysis; on the paralysed side there was no pressure and on the unparalysed side there was compression of the teeth. Further complete posterior bony atresia of the posterior nasal choanæ produced a typical contracted arch, whilst unilateral atresia produced no symptoms. That obstruction, by its mechanical results, was a factor in producing the adenoid face was shown by the fact that distortion of the face was hardly to be seen in people with a broad naso-pharynx, although the adenoid mass was of considerable size and other symptoms such as ear disease were present. But obstruction might not be the whole tale. He believed he could always trace a subnormal growth of the maxilla even in those slight cases of adenoids where operation was refused because there was no definite obstruction. In those cases either the obstruction passed unnoticed or there was a still further factor. The authors found that factor in diet deficiency, but they had to harmonise that idea with awkward facts. Why was it that the deficiency of growth was limited to the maxilla and upper parts of the face whilst the rest of the child was well grown? Why was it that removal of the adenoids gave such good results, including a sudden resumption of maxillary growth without any alteration of diet? He regarded the mandible as unaffected in its total growth in adenoid cases, but as failing to develop an angle in conformity with the failure of the maxilla to produce a tuberosity. Again, why were the teeth of good structure and size while the bone was subnormal. Diet deficiency had been strongly urged as a cause of badly-made teeth, but why did it affect the one and not the other?

Mr. Turner asked what support had the authors for the statements that the entire face was essentially a part of the apparatus of mastication and that the lateral direction was the most important in which to secure development of the parts concerned in mastication? Was there any failure in the mastication of a horse or a deer?

The authors believed that there were reasons for thinking that the alveolar bone was controlled by a mechanism different from that controlling bone growth in the rest of the face. He should like to draw their attention to some interesting facts he had noted in connection with movements of the teeth in the jaws after extraction of others. In the maxilla the first permanent molar—and the other two in sequence—would move forward *in toto* after extraction of a second temporary molar or second bicuspid, but after extraction of a first temporary molar or a first bicuspid there was no movement forward of the posterior teeth. Further, the second and the third permanent molars would move forward in the bone before eruption. In the mandible, after extraction of a temporary second molar or second bicuspid, the first permanent molar would not move forward—it only tilted—but after extraction of a first permanent molar the second bicuspid, and to a lesser extent the first bicuspid and the canine, would move backwards *in toto* and especially the second bicuspid would move back in the bone before eruption until it erupted absolutely against the second permanent molar. Those movements ceased with the cessation of the growing period, and were thus evident of bone currents. In connection with the growth of the antrum, the roots of various teeth commonly projected into the floor of the antrum covered by only a shell of bone. In the growth of a tooth-root the increasing root followed back the directions of the blood vessels supplying it. As those always ran in the bone the growing root always kept within the limits of the bone, and hence it was that retained teeth such as canines and bicuspids nearly always had a sharp angled extremity as if the root had turned away from the floor of the nose or antrum. The molar roots projected straight up into, with no attempt to avoid, the antrum, which consequently must have been enlarged downwards between them, after their formation or at least *pari passu* with their growth.

In criticising a paper such as this it is difficult to avoid the appearance of being captious or at least unappreciative. Time is short and the paper is full of interest. I am sure then that the authors will understand me when I express my admiration and appreciation of their work, and at once criticise according to my lights.

Mr. Norman G. Bennett said he was convinced that the permanent teeth did erupt into an arch more anterior than that of the temporary ones, and Sir Arthur Keith believed that himself, because he referred to the possibility of it in connection with the diagrams. That did not really explain what actually happened in the bone. It would be conceivable that with merely the addition of bone to the surface the upper teeth might erupt into a larger arch, but that did not explain the actual separation of the deciduous teeth which he believed could only occur by interstitial growth. With regard to the separation of the palate, he had referred on the last occasion to a clinical case in which the separation unde

treatment had been so rapid that it could not possibly have occurred except by separation at the suture, which presumably was not closed at the age of about ten. He thought Mr. Turner was entirely wrong when he said that the permanent molars in the lower did not move forward but only tilted. He agreed that they tilted as well as moved but in cases he had seen where the first permanent molar had come in contact with the first premolar, he could not see how it could have got there if it had not moved.

Mr. TURNER said that if an X-ray photograph was taken a tilting of the first molar and a space between the apices of the roots of molar and first premolar would be found when the anterior teeth had not moved back.

Mr. BENNETT said he had known it move forward before the premolar had erupted at all, while the deciduous teeth were still there.

Sir ARTHUR KEITH said the point which Mr. Turner had raised about the growth in the intermaxillary suture was a matter of great interest. The idea that growth did take place in that suture he had put forward with an open mind. He could not see an explanation for a considerable number of facts except by so arguing. Evidently a suture in the lower jaw was not necessary, otherwise there would be a suture at the chin. He supposed there might be an inward movement of the incisor teeth as new bone was laid down in the intermaxillary suture. It was a point worth looking into because he thought the alveolar bone was so extraordinary plastic that it might do anything. As John Hunter had said 150 years ago, that bone was the most extraordinary in all the body.

Mr. CAMPION said that Mr. Cale-Matthews had models of the upper dental arch of a child which had been measured very carefully. One was taken at the age of 10 and the other at the age of 10 years and 6 months, and they showed that in the six months there had been a lateral expansion of the upper dental arch of about $2\frac{1}{2}$ mm.

Mr. PITTS said the anatomical data in the paper were so advanced that the majority of dentists could scarcely criticise it, but it was interesting to try and correlate some of the diagrams by clinical observation. It was suggested in the paper that in contracted palates the third molar might actually be farther back. If that was so it might not improbably be less erupted if the occlusal plane was higher than that of the other molars. With regard to the spacing of the deciduous teeth, he believed there must be a movement forward, and found it difficult to think it could be other than by interstitial growth. Jones in his book on arboreal man stated that the spacing of deciduous teeth in modern children was less marked than it was in children of earlier times. He himself had been observing children for some time and there was no doubt that a considerable number of children at about the age of five did not show any spacing at all. Although spacing was still perhaps the rule in the majority of children, yet the number in whom spacing did not occur was not a very inconsiderable number. With regard to the alveolar process spreading down in contracted palates from the clinical point of view it was interesting to note that Hellman made a study of the variation of anterior

occlusion and found it very variable and the greatest degree of variability was in connection with overbite, which was what might be expected if there was a spreading down of the alveolar process. With reference to Mr. Rushton's remarks, it had been shown that there were some cases of narrow palates with absolutely straight septa. With regard to contracted palates and adenoid faces not being wholly due to mechanical causes, it was difficult to think that mechanical causes could be the sole cause. He had recently seen two cases of extremely contracted palate with a very marked degree of superior protrusion, with some maxillary retrusion, a typical case of class II occurring in very young children of 4 years and under, where there were no permanent teeth. At that early age it was distinctly uncommon. In one case he had to take out the upper central incisors and noted that there was an extremely marked bend in the root and wondered whether that indicated that the jaw was changing at a time when the roots of the central incisors were being formed, in the first year, so early in life that he did not think mechanical causes could possibly account for it.

Mr. H. CHAPMAN said at the last meeting of the British Dental Association he read a paper which dealt with an aspect of the problem but the point which he endeavoured to make was the importance of muscle action. In the discussion on that paper Mr. Campion said he would look forward to the matter being thoroughly expounded in about twenty-five years' time. He was very glad Mr. Campion himself had waited only about a fiftieth of the time to expound the problem still further. The authors had given three causes for the deformities in the masticatory face, which seemed to him a very apt term. Those causes were the diet—not the Sim Wallace diet but a diet containing certain accessory food factors —the hormones and muscle action. The authors seemed to be very indefinite about the latter, giving the impression that they felt muscle action might have nothing to do with it. It was important that the value of those respective causes should be placed in their proper order. If the cause was a lack of vitamines, was it reasonable to expect that that would effect the masticatory face only, leaving the children otherwise well developed? Another question was whether the children who had a diet containing the necessary food factors, and whose pituitary and other glands functioned normally—a diet which required no mastication—would develop a normal masticatory face.

Mr. TURNER said it would. There was a large number of imbecile children who had large jaws and some of them had to be fed with liquid food so that they should not choke themselves, as they had no idea of mastication.

Mr. CHAPMAN said that Baker of Boston experimented with a litter of rabbits. Two rabbits were kept as controls and others had their teeth ground down on one side so that they were functionless. Two or three months later the rabbits were killed and compared. Those which had not been treated at all had normally developed faces and heads, the development on the two sides being symmetrical, but in the other cases the development on the non-functional side was very much less than the development on the functional side, and Baker particularly referred to the fact that

the zygomatic process was much smaller in length and spacing between the body of the bone and the process. That seemed to prove that function had something to do with the normal development of those bones and was an experiment which could be quite easily repeated. He had recently seen three boys, brothers, who were brought up similarly. Their ages were between nine and eleven, and there was less than three years between all of them. In one there was absolutely normal occlusion with perfect arches; in another the deficiency of the growth of the arches was such that four premolars, one upper and lower on each side could have been removed and the remaining teeth would have been in alignment without any further treatment; in the third boy the condition was intermediate between the two. It seemed difficult to account for the difference in development. The only thing he could think of was that in the normal case the boy used his jaw muscles very thoroughly and effectively, and the undeveloped boy used his very slovenly. He noticed in the diagrams that those parts where there was muscle attachment, such as the distal portion of the lower jaw, had the greatest amount of growth and enlargement, but in the case of the ethmoid there was practically no growth at all, and of course there were no muscles attached. With regard to the narrowness of the upper arch; in many cases of distal occlusion it was only the upper arch which was narrow and the lower one was frequently of correct width but the jaw was too short. That seemed another point in favour of there being some other factor beside diet. It was pointed out in the paper very clearly that acromegaly was not the result of muscle action but of some pathological process, and he agreed with that because frequently acromegaly occurred late in life. It was a comparatively rare disease and one would expect a comparatively rare cause. But mis-shaped jaws were very common indeed and therefore one would expect to find a cause which was equally common, and that seemed to him to be muscle action as the result of modern diet. With reference to the width of the arches, he was not at all clear from where the measurements were taken. It was important to know that, because the same teeth were not in position at 5 years of age as at 25, and in any case the width of the jaw increased by backward and outward growth quite as much, if not more, than by an increase in width of any area containing deciduous teeth; there must be a similar increase in the maxilla.

Mr. W. Rushton said that some eleven years ago he read a paper before the Society on Facial Contour in which he suggested a standard. Taking all the races of mankind there could be no common standard, but as the ancient Greek standard of beauty was acknowledged to be ideal, he thought that it would be interesting to take measurements. He accordingly measured a considerable number of statues in the British Museum and found that the length of the face from the nasion to the under surface of the chin being taken as 100, the width of the face across the zygomatics averaged 108 for adults. In children the width was proportionately greater being as much as 130 to 100. The angle of the mandible averaged about 110 degrees. When one examined the faces of mouth breathers one found that the face as a rule was longer and thinner, very often instead of 108 to 100, the length and width

(as measured above) were equal, while the mandibular angle was often 125 or 130 degrees; in fact in certain cases the ramus and body of the mandible instead of approximating to a right angle approximated to a straight line. He considered that these modifictions of the bone were caused by regular muscular action long continued, and he thought the most reasonable hypothesis was that the condition was caused by mouth breathing. He quite agreed that there were many cases of adenoids where there was little or no modification of the bone, but probably these were cases in which the subject could still breathe through the nose in spite of the adenoids. Until a better theory was brought forward he was inclined to adhere to the received opinion. From a pretty long experience he felt absolutely certain that when in a young child all the temporary teeth were in contact, the permanent teeth would be overcrowded. He was not in agreement with the view that mastication had much to do with it. He remembered the case of an edentulous boy who never had any teeth of any sort, temporary or permanent, whose jaws were quite well developed, especially the mandible.

Mr. N. G. BENNETT asked whether he understood Mr. Rushton to say that there were no cases of malocclusion without adenoids—for instance those cases where the occlusion of the mandible was post-normal or the maxilla pre-normal with no question of contracted arch at all.

Mr. RUSHTON said he could not say. Mandibles were often seen that were not properly developed, where the mandible was say one unit behind the normal and there might not be any adenoids at all.

Mr. D. M. SHAW thought the authors had made a very splendid beginning in a complicated subject, and had given a very valuable series of careful sketches that would probably for a long time form the working drawings for future investigation. The authors would no doubt like more satisfactory base lines. Instead of the three co-ordinating planes of reference used in engineering and geometrical work, it would seem that there was only one that was absolutely fixed and definite, and he supposed that would be the median sagittal plane. on either side of which there was bilateral symmetry. Mr. Rushton and others had to fall back upon the æsthetic point of view, which was of great help but should be kept in its proper place when scientific measurements and observations could be made. The base lines of the authors might give rise to a certain amount of perplexity, because in Figs. 1, 2 and 15 they used as a base point the posterior extremity of the line that went forward, and in another series they practically used the anterior extremity. The normal dental arch of man was clearly to be distinguished—and by linear shape alone—from the arch curve of any other animal, and yet it was remarkable how long a time it took for the average student to get a clear mental picture of the shape of the arch so as to be able to reproduce it without copying from models. His plan was to have a transparent plate of celluloid with a normal arch drawn in outline upon it and a line representing the median plane, and another crossing it behind the canines at right angles, and another crossing behind the second or third molars. One or more celluloid plates could be superimposed with the temporary teeth in their supposed normal relationship. He should

like to know how far forward or behind in relation to the permanent arch that temporary arch might be placed.

Mr. COLEMAN remarked on Sir Arthur Keith's statement about the growth of the upper part of the face being the pace-maker for the growth of the lower or mandibular portion and this statement seemed to explain a condition that Mr. Coleman described in a paper on "Exostoses of the Mandible," read before the Royal Society of Medicine in November, 1909. In this paper he drew attention to the frequent manner in which the molar teeth were slung over the inner surface of the jaw so that they were almost unsupported by the body or basal element of the jaw.

This unsupported trough or shelf of bone carrying the molar teeth was best developed in thick-set jaws with firm well-worn teeth apparently bearing, as he then stated, some relation to the amount of lateral strain thrown on the lower jaw. This condition, according to Sir Arthur Keith's paper, may be explained as an instance of adaptation of the lower to the upper jaw and bears out Sir Arthur Keith's statement that it is the alveolar bone element which reacts and brings about apposition.

Another problem, which is of larger and greater interest, is the problem as to what is the factor that presides over the co-ordination of growth. It has always seemed suggestive to him that the gland which presides over the growth of the body should have its origin at a situation where ectoderm, entoderm and mesoderm meet and in the proximity of nervous tissue. Such a selective site of origin might lead one to a supposition that some form of hormone becomes developed in this region that contains elements of each type of cell which subsequently controls the growth of the body.

Mr. WATKIN said he had a patient in whom two-thirds of the tongue was not developed at all, and the lower jaw was very small indeed. It seemed that the size of the tongue had a great deal to do with the development of the lower jaw.

Sir ARTHUR KEITH said the missing part of the tongue was derived exactly from the same elements as the other part of the jaw, and if the one part was absent the other part should be absent also. It was a very rare case.

Dr. SIM WALLACE said he was disappointed with the paper because it was supposed to be about the mechanism of growth and it seemed to him that it was just the mechanism of growth which was left out. For a long time it used to be argued that the growth of bone and teeth was determined by heredity and it was not getting much further to say that it was due to hormones. The idea of the pituitary influencing the matter was not of very much help when dealing with certain bones of the face which in certain conditions increased vertically and decreased laterally. In many cases the face was long, which might be due to excess of pituitary, and at the same time narrow which might be due to want of pituitary. There might be a fairly defective lower jaw and a superabundance of bone at the fore part of the upper jaw ; there might be a narrow palate and the alveolar process might be extra deep. It seemed very difficult to see how mechanics could be got from the pituitary. With regard to interstitial growth, Mr. Tomes considered it was practically inconceivable in such a dense tissue as the bone. The idea of interstitial growth was unthinkable and there was no need

to bring it in when it was known that alterations in the jaw bone took place by the deposition of bone at one part and absorption at the other. If there was a tongue broad enough to expand the arch, the teeth were forced outward and concomitantly there was a deposition of bone on the outside and an absorption on the lingual side. In some recent lectures Sir Arthur Keith had drawn attention to the fact that cretins although they had not much muscular activity had large arches and he noticed that the tongue was large. That really indicated something about the mechanics of growth. There had been extremely little reference to the gentle mechanical factors that seemed to influence the growth of bone that was to say the growth of the adjacent soft parts. In the skull it appeared to be the gradual growth of the soft brain, and he believed it to be similar with the jaw, that the growth was due to the mechanical factors associated with the growth of such structures as the tongue and muscles of mastication. Although he did not perhaps attach the same importance to muscular action in causing the growth of the jaw that he once did, he could not help thinking that that growth of the jaw was to some extent influenced by the muscles of mastication. The type of face caused by mouth breathing seemed to be purely mechanical and absolutely independent of hormones. Mr. Turner once brought forward cases of very well developed arches where adenoids were present and blocked nasal respiration. For some reason or other, however, tubes were put into the trachea so that the child was able to breathe through its trachea instead of through its mouth, and in this particular case the jaw seemed to expand remarkably well, which showed once again the importance of the tongue in expanding the arch.

Mr. TURNER said that in those cases he found the fact that there was no use of the nose for breathing did not at all influence for evil the growth of the upper jaw, but in the case of the adenoid children there was a definite although not a very large amount of sub-normality of the upper jaw.

The PRESIDENT thought Dr. Sim Wallace had been a little severe because he did not think the authors used the word mechanics in exactly the same way as Dr. Wallace had interpreted it. They were endeavouring to show what was the normal condition of things, but a great deal of the discussion had wandered away in the direction of abnormal and pathological conditions. There appeared to be more than one factor at work, and the Society were indebted to the authors for the results of their examinations showing the points at which new bone was, in their opinion, undoubtedly laid down. With that as a standard a useful result should be obtained. There seemed little doubt that where muscles were inserted into bone there was bone development. He agreed with Mr. Norman Bennett in regard to the tilting of the first molar. The position taken up by permanent teeth, whether tilting or moving forward or by bicuspids going back, was very much determined by the question of what other teeth were present in the jaw and what articulation of cusps remained. It was quite possible to get a lower molar stopped from coming forward by a tooth in the upper jaw being retained in front of it. He had seen sections made by Dr. Cryer which showed that the hard palate had pushed the tongue into a very abnormal place. With regard to the increase

in size of the brain and whether the skull developed first to provide the necessary accommodation, or whether the soft brain "pushed out" the skull, that was a question which anthropologists would like to discuss with Dr. Wallace. The question was raised in the Rhodesian skull which had the largest palate that had ever been noticed. The first sight of the skull led one to think of the Neanderthal man and the pituitary body, and so on, but then came the question as to whether the pituitary function was beneficial, because those races had died out.

Sir ARTHUR KEITH hoped the younger members of the Society would take up the question of growth because it was a very important one. As scientific men they wanted to explain the whole thing not by guesses, but on a scientific basis. The paper was a little preliminary canter to show not the extent of the knowledge but the extent of the ignorance concerning things there should be some knowledge about. Mr. Turner had raised the question with regard to the whole face being simply a part of the instrument of mastication. He did not think that question would have been raised. If the lower jaw or the upper jaw was taken away a great part of the face had gone. The whole face was mastication, the only part not controlled by mastication being the nose, which was under a completely different scheme of growth. As the jaws retracted they left the nose exposed and there was a contraction of the whole face leading to a pinching in and prominence of the nose. Judging from the data he had collected there was no getting away from the fact that faces were changing. He was still under the impression that some people took much too easy a view of the mechanics of the development of the face; the development of the face and jaws was infinitely more complex than was usually supposed. With regard to the co-ordinating mechanism, the paper simply alluded to what the authors thought the possible causes but they knew they were not in a position to assign causes yet. Much of his conception of growth was based on a study of acromegaly. The pituitary substances must be looked on as merely sensitising substances—the substances which caused the growth were produced as a result of muscular action. In acromegaly so sensitive was the bone that a muscular normal action brought about a huge reaction. Diet which was deficient in certain elements brought about very remarkable changes in the adrenal glands and a change in the alimentary and the lymphoid system. Probably Nature used food to regulate development by influencing the secretions of the endocrine system. Vitamines were apparently essential things and somehow acted upon the endocrine glands. In the meantime the first thing to do was to find out something about normal growth before beginning to talk about contracted palates or anything else. He hoped the younger men would go on with Mr. Campion's work and he would undertake at the Royal College of Surgeons to help them to follow out the work he himself had begun, putting at their disposal all the material he had. The basis of orthodontic work must be a complete and thorough understanding of the growth of the normal face.

The thanks of the Society were accorded to the authors for their paper, and the meeting adjourned.

AN Ordinary Meeting of the Society was held at 11, Chandos Street, Cavendish Square, London, W., on Monday, May 1st, 1922.

The chair was taken by Mr. SIDNEY SPOKES.

The minutes of the previous meeting were read and confirmed.

The CHAIRMAN said that members would remember that at the last meeting it was decided that a vote of condolence should be sent to the family of the late Dr. Bogue. A reply had been received from Dr. Bogue's daughters, Mrs. Campbell and Miss Bogue, thanking the members of the Society for their sympathy.

The following new members were elected: Arthur G. Allen, L.D.S., 128, Queen's Road, Bayswater, W.; J. L. Dudley Buxton, L.D.S., 38, Harley Street, W.1.; Augustin E. Croke, L.D.S., R.C.S.Eng., D.D.S.Penn., Sussex House, Guildford; Sidney W. Fisk, L.R.C.P., M.R.C.S., L.D.S., Street Lodge, Essex Road, Watford; W. Trevor Johnson, L.D.S., 42, Sheep Street, Stratford-on-Avon; Mrs. Lilian Lindsay, L.D.S.Edin., 23, Russell Square, W.C.1.; Robert Lindsay, L.D.S.Edin., 23, Russell Square, W.C.1; Trevor Matthews, L.D.S., 42, Sheep Street, Stratford-on-Avon; William Ovey, L.D.S.Eng., 42, Gloucester Gardens, W.2.

Mr. Coysh was present at the meeting as a visitor.

The CHAIRMAN announced that unfortunately Professor Fawcett of Bristol was unable to be present at the meeting. Professor Fawcett had written expressing his very great regret. He (the Chairman) was sure that all the members would share in that regret. Professor Fawcett hoped to read his paper at some future time. The Council had arranged that some Casual Communications should be brought forward at the meeting.

The first Casual Communication was from Mr. C. S. Morris on a very pronounced case of Class III (Angle).

Mr. C. S. MORRIS (illustrating by means of the epidiascope) said that this was the case of a female child. Members would notice that she was a fairly well nourished child of good vitality. It could be seen from her face that she was not a dull-looking child. (Illustration of Models, page 1.)

He would like to point out two things about the features generally. One was that she had a very decidedly square jaw for that type of case. That, he thought, was rather unusual. The other was that she was rather hammered in in the front. That was very noticeable. Members would see that in the pre-maxillary and nasal region she was decidedly flattened. Looking at the lower jaw alone one saw that it was not normally prominent. On the whole, the child was a well-nourished child, with a happy expression, and lively and of good vitality. As far as the child's general history went there was no history of adenoids. She had been all her life a normal child except for her appearance.

The thing that struck one at once when one looked at the two models side by side was that they did not seem to have any relation whatever to one another. There was an extraordinary dissimilarity. The lower jaw was a little narrow across. The upper jaw was extraordinarily shortened antero-posteriorly.

He wished that it were possible to show the whole thing so that members could see what an extraordinary relation there was in front. Putting the models into relation with one another, what one obtained was a very extraordinarily short arc on the upper jaw, running right across, leaving a great gap between the maxillary incisors and the mandibular incisors.

With reference to the treatment, he hoped that members of the Society would be able to suggest what the treatment should be. The case was not a very easy one to treat, and he would like to have all the light upon it that he possibly could have. He had never before had a case approaching it. He thought that it would be a useful case to discuss in the Society, and therefore he had brought it forward. He

might mention that the patient was six years of age on February 22nd last. The condition was always present.

Mr. SCHELLING said that he had a very similar case some twenty-five years ago, the case of a lad of twelve or fourteen years of age. Mr. Tomes and Mr. Betts saw the case at the time. It was decided that, unless the relatives thought fit to consult a surgeon and have a large wedge taken out of each ramus, nothing could be done. From his facial appearance, it was thought that he might develop into a person looking like a pleasant kind of bulldog. He had !

The CHAIRMAN said that he did not think that Mr. Morris had mentioned whether the girl had any brothers or sisters or whether she was an only child, or whether there was any kind of history in the family of such a condition.

Mr. MORRIS replied that there was no history in the family of any other case. He had made inquiries upon the point. Her sister was quite normal.

Mr. PITTS said that, looking at the models and at the photographs, it struck him that there was in the case a combination of two conditions. Apparently the mandible was affected, if one might judge from the occlusion, but it also seemed to him that it was almost as much a case of maxillary retrusion as well as a case of mandibulary protrusion, if one might judge from the photograph. So the two, acting together, had undoubtedly constituted a very formidable deformity. It was certainly remarkable at such an early age, because one's experience was that in such cases the deformity became worse, and the prognathous appearance was likely to increase. The child had the appearance that one really associated much more with a protruding mandible. One would imagine that the deformity in the case was likely to increase.

As far as treatment was concerned, it seemed very difficult to suggest anything. He did not know whether possibly pushing forward the upper arch might help in any way. It might help a little in making the deformity appear relatively less marked. But then the difficulty was that the rest of the case consorted with the appearance of the jaws, and a pushing forward of the tooth might only make the facial appearance worse. The case was extremely interesting, and one was interested to hear that apparently there was no history of anything of the sort at all. Habits were sometimes suggested as being a factor. Sir Frank Colyer had suggested abnormal presentations at birth. One would certainly think that there was a developmental effect which might be explained to some extent possibly by lack of growth of some of the various sites about which Sir Arthur Keith spoke at the last meeting.

In answer to Mr. BADCOCK, who asked whether the child could breathe normally through her nose, Mr. MORRIS replied that she could.

The CHAIRMAN asked Mr. Badcock whether he had any suggestions with reference to treatment.

Mr. BADCOCK replied that he was afraid he had not. Class III cases always seemed to him to be particularly hopeless. He had yet to see a case which had been treated satisfactorily in any other way than by extraction, if one could consider that method satisfactory: It resolved itself into tilting back the lower teeth. He was wondering whether the exhibition of extract of one of the ductless glands might help. It seemed obvious that the main fault was in the development of the upper jaw.

The CHAIRMAN agreed.

Mr. MORRIS thought that, looking at the child and the models generally, the under-development was mostly in the pre-maxillary region. The child was undoubtedly a little pre-normal in the mandible, but not very markedly so. It was not very easy to see everything on the screen. It was not so noticeable there that her mandible was at fault. As a matter of fact, it was the pre-maxillary region of face that was wrong. The striking point in confirmation of that was that her

second deciduous maxillary molars were almost their proper width across. Looking at the models, one would see that the child was very short antero-posteriorly in the maxilla. As to treatment, he had thought of doing what Mr. Badcock had said except as far as his remarks about the extract of ductless gland were concerned. He had thought of taking out a bicuspid on each side of the mandible and retracting very slowly over a long period of time, with an attempt, if it were possible, to move the anterior teeth bodily backwards. He had a very difficult case of the sort some years ago. That method seemed to him to be the only hopeful one. One could not start the treatment now; but, at the same time, one would start and try to develop the pre-maxillary region by bodily movements anteriorly of the anterior teeth. That was all that he could suggest. He would like any members present to criticise that suggestion as severely as they could, because he really wanted to know how to tackle the case. He did not feel inclined to advise the resection of piece of a mandible on each side. He saw Sir Arbuthnot Lane do that once with very noticeable effect. He did not know the subsequent history of the case. He did not know at all whether it was usual, as Mr. Pitts had suggested, for such cases to get worse and worse.

Mr. W. RUSHTON said that he had just had a case which was not nearly so pronounced as the case under discussion. He had treated it. He had waited until the permanent incisors had erupted, then he raised the bite and pushed those over the lower teeth and extracted a right lower lateral. The result was excellent. Whether Mr. Morris would be able to do that in such a pronounced case as the one now before the meeting he could not say.

The CHAIRMAN said that the Society would be very much indebted to Mr. Morris if he would follow up the case and let the members know at some future meeting of the Society what the development was in two or three years' time or, perhaps, an even longer time than that. He thought that they must now challenge Mr. Rushton to produce the models of his case at some future meeting.

Mr. RUSHTON said that he would produce them with pleasure.

Mr. MATTHEWS said that a good many years ago his father started treating a case on the same plan as Mr. Rushton had mentioned. He observed that had he taken out one of the lower incisors he might reasonably have expected the upper arch to have dropped down over the lower. It would just have reached and come over the edges. It was just over, but it looked as if there was very great proclination. There was every probability that had he taken out the incisor, too, the appearance would have been better and it would have been more comfortable for the child.

The CHAIRMAN said that he would ask Mr. Badcock to bring forward his Casual Communications.

Mr. BADCOCK said that the notice had been very short, and he had just laid his hand upon the three cases which happened to be the nearest at the time. They were three very ordinary cases, but perhaps they were none the less interesting for that reason, because they were of the kind which dentists so frequently met.

His principle of treatment was very simple. He aimed at two things, efficiency of function and good appearance, and he tried to reach the goal by the nearest route.

The first case was that of a child who was eight years of age when the treatment began. It was a Class II case, and there was considerable crowding in both jaws. The child was treated by expanding with expansion plates first of all. After a while a biting plate was put in to raise the bite. Then, when the temporary teeth which had supported the expansion plates came out, a buccal arch was put on the upper jaw and a lingual arch on the lower jaw, and reciprocal traction was used. The child was still wearing her lingual arch because one of the

lower pre-molars had not yet erupted. Otherwise the case was practically complete. (Page 1 in illustrations.)

In reference to expansion, it might interest members to know that the expansion screw which went by his name had been very greatly improved by Messrs. Ash, who had introduced into the mechanism what was practically a spring washer which prevented the backward movement of the screw. Formerly the thing was continually unscrewing and wasting time. That was a very unsatisfactory feature. Now one could rely upon it, and, provided that the instructions were carried out, it acted every time. There was one other little point about the apparatus which he might mention. Some people had grumbled and had said that the parallel bar was placed too near to the screw, making it impossible to get a key in between. That was true ; but there was no necessity to get the key in between. If one made a wide division between the halves of the plate behind the screw there was sufficient room for the key. It seemed to him that getting the parallel bar close to the screw was an advantage inasmuch as it made the whole apparatus smaller. He found, in talking to one gentleman about it, that it was his habit to screw the apparatus up in the mouth ; but he (the speaker) saw no advantage in doing that. In that case a wider space would be necessary. *That* was the little expansion plate. (Showing plate.) One could see at the back a wide space between the two halves of the plate, which allowed one to put a key in at the back.

The case which he had just shown members was begun in March, 1918, and was now finished. It had taken about four years. It seemed to him that one could not hurry cases at that age. One must wait on growth.

He did not think that there was any fear of a relapse, because at the present moment the child could not get her jaw back, even if she tried.

The next case (II) was that of a boy who was nearly fourteen years of age when he first saw him. It was a Class II, Division I case. The teeth were protruding instead of being crowded. The treatment was begun in September, 1919. It would be seen from the models that there was in that case again a very marked overbite. The lower incisors were biting on the palate. At the patient's age he thought that reciprocal traction had no chance of success, also that a biting plate by itself would probably not be of very much use, so he extracted first upper premolars and fitted arches on both jaws with hooks over the incisor teeth, mounted on D-bands. Bending the lower arch down in front depressed the lower incisors and tended to raise the lower molars. Similarly, the upper arch, while it retracted the incisors, also pushed them upwards, and in that way one was able to overcome the overbite, which was very considerable. The treatment began in September, 1919, and in the following April he put in a biting plate in addition, which the patient wore for three months. That was in August, 1920. Eleven months after the beginning of the treatment he removed the lower arch entirely. He used the word " I," but as a matter of fact the case was carried through almost entirely by his partner, Mr. Doherty. It was really Mr. Doherty who ought to be bringing the case forward, and not he. The case was finished in December, 1920, about fifteen months from the time at which it was begun. The apparatus was not taken off until much later, because the parents were very anxious that it should not be. They had had experience of another member of the family who had been treated and whose case had relapsed utterly. That case was not treated by Mr. Doherty.

This case was rather more difficult than the other because of the boy's age, although he might mention that there was considerable trouble because the boy was always falling ill. He was a very delicate boy and was ill for months at a time.

That was the result. The lower incisors were now biting on the cingula of the upper incisors and not behind them.

He thought that the case was rather an interesting one, because of the excessive overbite.

The next case (III) was that of a boy who had, he thought, the flattest palate that he had ever seen. He was aged twelve. The case was begun in January, 1920. He adopted the very unusual treatment of extracting the canines. He began by retracting the upper incisors. The case was begun in January. In July the anterior teeth were so far back that they touched the lower teeth. Then he put in a biting plate. The patient wore the biting plate for rather longer than three months. Eventually the upper teeth came back as far as they would go, and there was still a small space between the upper laterals and the first premolars. So he extracted a lower incisor and continued retraction of the upper. To-day that space was entirely closed, and the spaces in the upper jaw also.

In order to show how flat the boy's palate was, he had taken a piece of composition and pressed it up with his thumb into the palate. The upper line was the line of the boy's palate. He had sketched in roughly in pencil the position of the incisor teeth as nearly as he could guess it. They were lying almost horizontal and almost parallel to the palate, and the palate was almost flat. That was his difficulty, and the reason why he took out the canines.

He did not think that anyone talking to the boy would know that he had not any canines.

Mr. W. J. May asked how Mr. Badcock had advanced the lower jaw in the first case.

Mr. Badcock said that it was done by reciprocal traction, using a lingual arch in the lower jaw instead of a buccal arch, such as one used years ago. He was asked whether the treatment improved the depth of the palate in the third case. It would be seen that the palate was quite different in appearance now. He did not suppose that the treatment altered the palate really; but the general effect was different.

The Chairman thought that Mr. Badcock must be congratulated upon the result which he had obtained in the case in which he removed the canines. He had seen cases in which the upper canines had been removed. He had treated many regulation cases in his time, but he did not think that he had ever brought himself yet to extract an upper canine. He thought in that case Mr. Badcock was justified in his treatment. He (the Chairman) would have been still more satisfied if he could have seen a photograph of the patient; but he understood Mr. Badcock to say that anyone in conversation with the boy would not know that he had really lost his canine teeth.

Mr. Badcock replied that the boy was a very small-featured boy, a little boy, with a small face and small features altogether. He had never had any canine prominence except that the tips of the canines stood out. They were the prominences. The result was that there was no canine prominence in the ordinary sense of the word. The absence of it was not at all noticeable. The boy was quite a nice-looking boy. He would be very much obliged if any member would tell him how else he could have treated the case. He did not want to extract the canines, but how else could he have dealt with the case?

Mr. Schelling said that his sister had an upper canine tooth taken out when she was at school in Switzerland some forty years ago. The absence of it was never noticeable.

The Chairman said that he would now ask Mr. Northcroft to be good enough to give the members a Casual Communication.

Mr. Northcroft said that he regretted to say that Mr. Garrow's Communication had turned out to be much more elaborate than was at first contemplated, and therefore he had postponed it.

The first case was that of a locking device for a lower lingual arch which had been actually worn. He found it quite successful. It had proved its use where the temporary molar teeth were very shallow

and vertical tubes were, consequently, excessively short. He had found when that was the case that the front of the arch had a great tendency to ride up and down. The horizontal tubes gave a longer bearing surface and held the arch rigidly in place. (Illustration, page 3.)

The arch was made with a stop on each side to abut against the ends of the tubes. It was placed in position by inserting the right-hand end in the closed tube, and then snapping in the left-hand side in the half-open tube, having first pulled back the latch out of the way, which returned in front of the stop on the arch.

The second case (Fig. 2) which he would like to bring before the notice of the Society was that of the models of a male at the age of four years and nine months and the same at twelve years and one month, which showed a condition which, as he had pointed out for over twenty years, so often existed and which, for the most part, the textbooks still denied; that is to say, that the temporary dentition could foreshadow most of the irregularities found in the permanent. The chief interest in this particular case was that the permanent dentition had followed the irregularities of the temporary dentition almost exactly and showed a condition that must occur in a very large number of cases, only, when they were seen in the permanent dentition, all record of the positions of the temporary teeth was lost, because of the failure of practitioners to take sufficient interest in the tedious side of research work. Two outlines of the labial surfaces of the temporary and permanent dentitions were thrown on the screen and showed that, instead of the permanent arches being so much larger, there was no room to accommodate the permanent teeth without crowding.

It was with some surprise that he saw that room was given in the *British Dental Journal* for April 15th to a translation from the *Bulletin de la Société Anatomique*, in which the author claimed that, because the measurements of the teeth in the temporary arch of three neolithic child skulls totalled the same or more than the permanent teeth as measured in their crypts, therefore the temporary arch was identical with the permanent one. The author showed that, far from being identical, in only one skull were the measurements identical, and that in the two others the measurements of the temporary arch actually exceeded the permanent, in one case by 3 mm. and in the other by 6 mm. By contrast, and without appealing to Sir F. Colyer, Sim Wallace and others, he (the speaker) wished to show models (Fig. 3, p. 4) where the spacing at six years old was very marked, which had imbrecated lower incisors eight and a half years afterwards. Although the diameters of the teeth of the two models in the lower measured 65.8 mm. and 70.2 mm. respectively, there was crowding in spite of the spacing, and hence the mandible needed more interstitial growth than actually took place. The upper measurements showed a corresponding excess of the permanent upper, the measurements being 75.2 mm. and 81.8 mm. respectively. The labial measurements of the temporary upper arch and the permanent upper arch, measured with lead foil, showed a difference of 6 mm., while the lower arches measured in the same way showed only a difference of 1 mm., proving that the spaces between the temporary lower teeth accounted for 4 mm. This incidentally showed also how fallacious the measurements of M. Siffre must necessarily be. Those were models of the case of a male aged six.

There was one other model which he would like to record. It showed the absence of an incisor in the mandible of a male child aged five. The arch was otherwise quite perfect. There was naturally a certain amount of space in the incisor region which was due to the absence of the one tooth. (Fig. 4, page 3.)

He would be interested to hear if other members had ever seen such a case.

The little patient was too nervous to have radiographs taken.

Mr. Pitts said that he had a case recently bearing a little on the last case and which was, perhaps, even more interesting. It was

that of a boy in whose case there was the absence of two lower incisors in both the temporary and the permanent dentition. The teeth that corresponded to the lateral incisors were conical teeth, and there was a big gap between them. The boy was about ten or eleven years of age. His mother said that there had never been any other teeth but those two, and that there had always been a space. The next week he was able to see the boy's brother. He showed precisely the same condition. The mother said that a twin brother of the boy, who was now dead, also had the same condition. Therefore there was a congenital absence of two incisors in both dentitions, and there was the presence of conical teeth in three members of the family. The mother herself had normal teeth, and so had her husband. He had been unable to obtain any other history.

With regard to Mr. Northcroft's remarks, in which he criticised the work of Siffre, Siffre had made some fuller communication upon the subject to the recent Orthodontic Congress in France. He termed it a law. He (the speaker) took no responsibility for Siffre's work—he had not had the opportunity of seeing Siffre's later work; but personally he must say that he did not think that it had a great deal of bearing.

Mr. GEORGE THOMPSON said that last week he had a case of a patient with only three lower incisors. They were all different sizes. The middle one was very small. On the left-hand side what was supposed to be a lateral incisor or a central was nearly twice the size of the other one. The right incisor was normal size for a lateral. There was no appearance of gemination of the two on her left side.

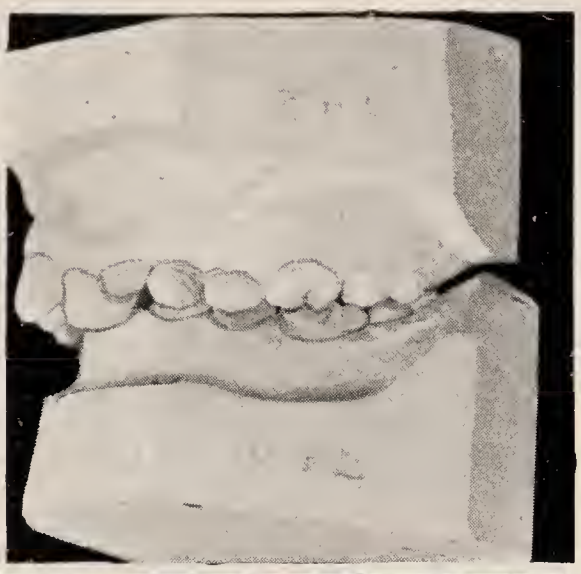
The CHAIRMAN said that he would ask Mr. Bocquet Bull to describe an unusual case of contracted arches.

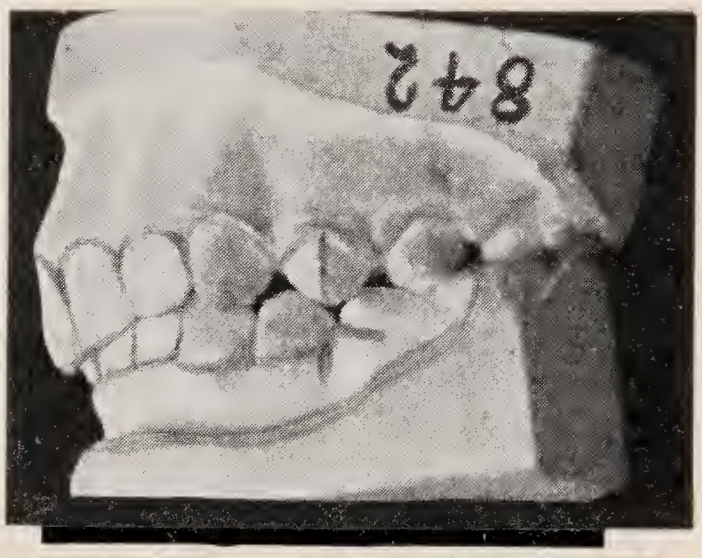
Mr. BOCQUET BULL said that the patient, a girl, *æt.* twelve years, attended on September 22nd, 1921, at Guy's Hospital. The condition of growth was shown in the first two models (Fig. 1). The treatment was not proceeded with at once, as there was a long waiting list, and she was asked to attend again. On January 20th of the present year, four months later, she again attended. Further impressions were taken, and when the models were compared it was noticed that a marked decrease in the width of the maxillary arch had taken place.

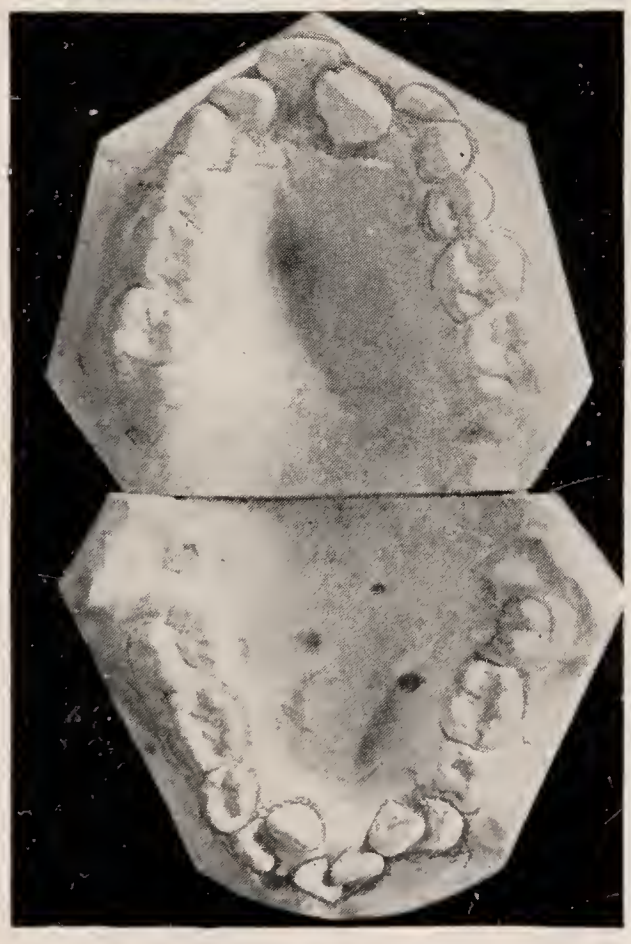
Figure 2 shows the models taken four months later. He referred the patient to the Throat Department for a report on the condition of the nose and throat, and received the following report: "A few adenoids. Septum deflected to the left, but not very marked. Some muco-pus, indicative of chronic rhinitis, which would conduce to mouth breathing." The mother had previously informed him that the girl had been a mouth-breather from infancy. The child was apparently in excellent health and well-developed. A third set of impressions was taken on April 26th, a few days ago. They showed very little in the way of change as compared with the second set of models.

He had brought the case forward very hurriedly, and had not time to take anything much in the way of accurate measurements; but one could see definitely from the models the marked difference. The rough measurements were as follows: the maxillary arch measured between the antero-buccal cusps of the first permanent molar teeth in the first model gave a measurement of 45 mm., and in the second model, taken four months later, 39 mm. The distance between the buccal cusps of the first premolars in the first model measured about 35 mm., and in the second model 28 mm.

In the mandible there was also a slight difference, but one of expansion, and not contraction. The measurement taken between the antero-buccal cusps of the first permanent molar teeth in the first model was roughly 38 mm., and in the second 43 mm., an increase of 5 mm. Taken between the buccal cusps of the first premolars in the first model, it was 28 mm., and in the second model 33 mm., a difference of 5 mm.

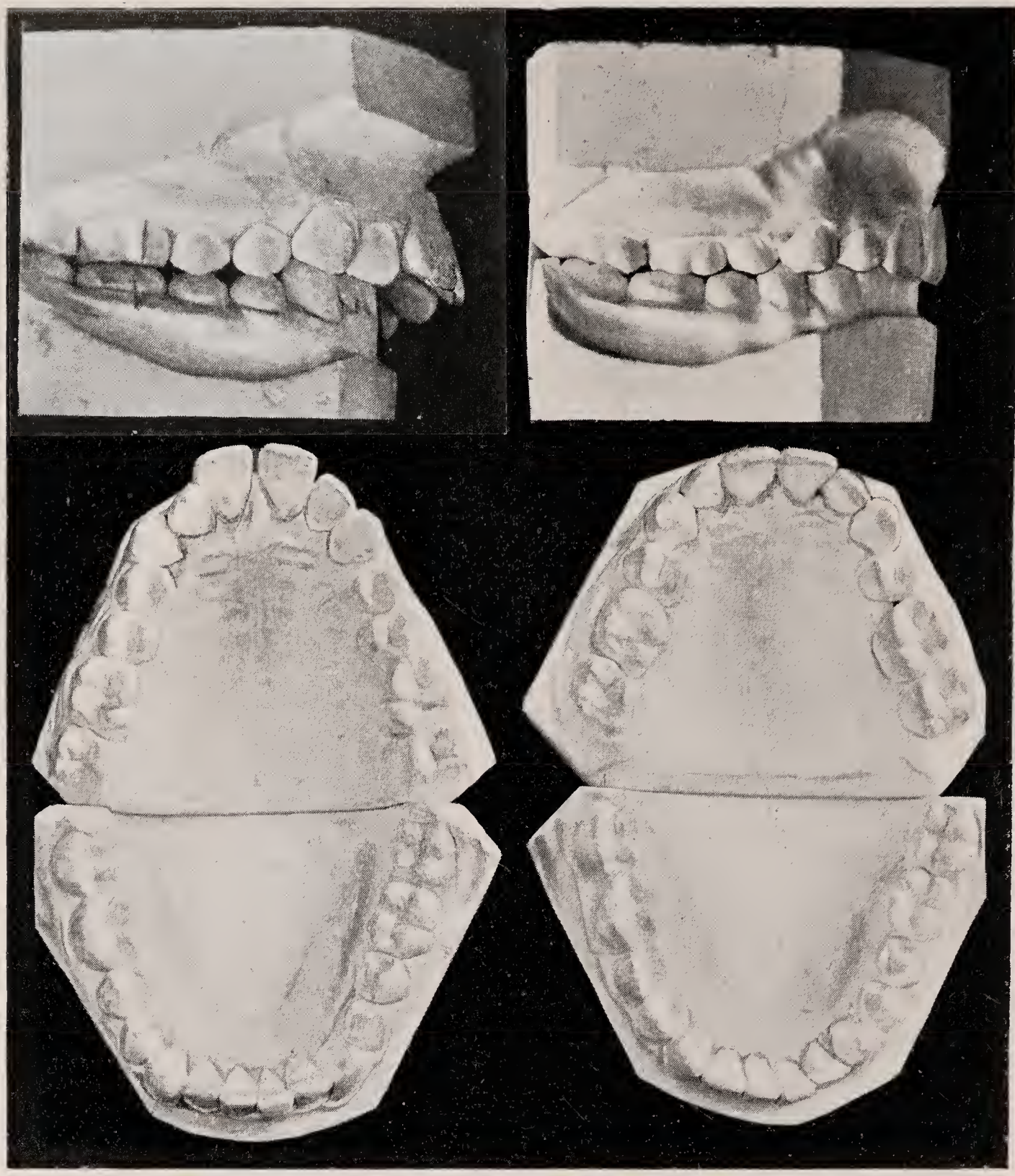






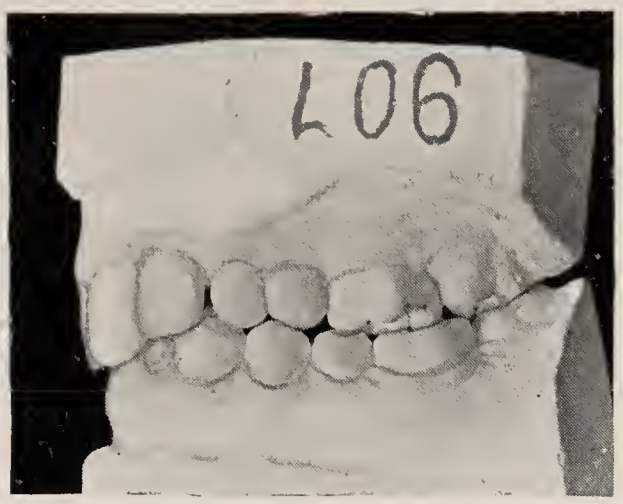
Mr J. H. Badcock's Case.—I

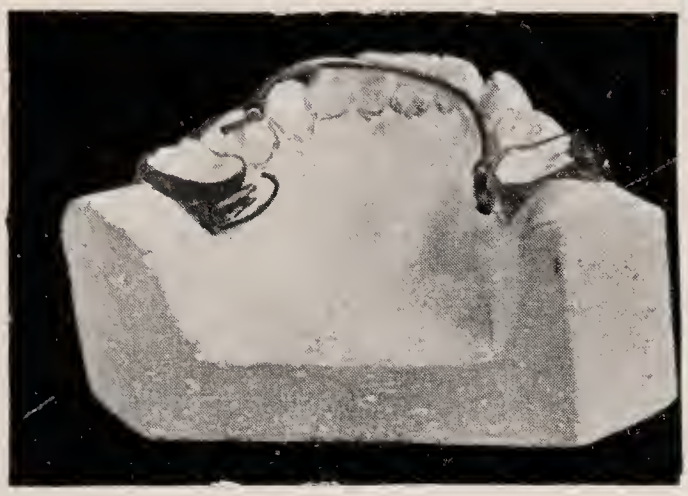
MR. BADCOCK'S CASE.—II.



MR. BADCOCK'S CASE—III

Mr. Badcock's Case.—III.





Mr G. Northcroft's Locking Device.

Fig. 4. Mr. G. Northcroft's Case.—IV. to show three temporary lower incisors.

Fig. 2. Mr. George Northcroft's Case.—II.

FIG. 3. MR. G. NORTHCROFT'S CASE.—III.
FIG. 4. Appears on page 3.

FIG 1. FIG. 2.
MR. BOCQUET BULL'S CASE.

As to what the contraction in the upper arch was due to, he had not been able to find out, and he was afraid that he had not any suggestion to offer. The child was perfectly healthy and perfectly well developed. It was simply owing to the fact that it was not possible to proceed with any treatment immediately that the contraction was discovered.

The CHAIRMAN said that Mr. Bocquet Bull seemed to have been very fortunate in getting a case which showed the contraction in the making, so to speak. It was rather a fortunate thing for the members that it was not possible for the case to be treated on the first occasion.

The Chairman said that he hoped that members would be able to look at the models, because he felt quite satisfied that the difference was not shown so well on the epidiascope as it was in the models. He did not know whether it was due to the illumination not being the same with all three models at the same time.

He thought that a vote of thanks was due to Mr. Morris, Mr. Badcock, Mr. Northcroft, and Mr. Bocquet Bull for providing the members with such a great deal of useful material. Members would, he thought, all share his opinion that the evening had been a most instructive one. The cases which had been brought forward were really very interesting, and they had to tender their thanks to those gentlemen for having stepped into the breach at very short notice.

The motion was carried by acclamation.

The CHAIRMAN said that the next meeting was fixed for October 2nd and would be a demonstration meeting. Several demonstrations had already been promised to the Secretary, who would be very glad to hear of any other demonstrations for that occasion.

The proceedings then terminated.

AN ordinary meeting was held at 11, Chandos Street, W., on October 2nd, 1922, when the following new member was elected: J. Stuart Smith, L.D.S., R.C.S.Eng.

Mr. A. T. PITTS brought forward the following Casual:—

IRREGULARITY OF THE INCISOR TEETH CAUSED BY TWO SUPERNUMERARIES, WITH RESULTS OF TREATMENT.

THE patient, Blanche M., was seen by me at the dental department of the Hospital for Sick Children in October, 1919. She was then 11 years of age. She was brought because the maxillary central incisors had not erupted. The lateral incisors were present and in normal position, and there was a wide gap between them. No impressions were taken on this occasion. The patient was next seen in February, 1920. (Fig. 1.) The right central had erupted labially to the lateral and completely overlapped it. I decided to remove the lateral and allow the central to come into its place. The right central gradually came into good alignment, but there was no sign of the left central. I next saw the patient in October, 1920; the right central was then in place; the left central had appeared and was partly erupted. It was badly placed, the crown was twisted through a right angle with the lingual surface directed mesially and the long axis of the root very oblique. There was a supernumerary tooth on the left side on the mesial aspect of the left central, while another supernumerary tooth was just commencing to erupt internally to the right central. The left canine was badly placed being external to the arch. (Fig. 2.) I extracted the left supernumerary and the left canine, an unorthodox method of treatment so far as the canine was concerned, but I did not feel

justified in disturbing the alignment by removing either the lateral or first premolar. The patient was next seen in February, 1921; the right supernumerary had erupted sufficiently to be easily extracted. (Fig. 3.) Both supernumeraries had somewhat tuberculated crowns with short conical roots. The left central had erupted further; it did not look a very promising tooth for regulation, both by reason of its torsion and obliquity, but I thought that immediate regulation to correct the torsion might be worth trying, since, even if it failed the only alternative seemed to be extraction and a denture later. A splint was made beforehand consisting of bands to the right central and left lateral with a bar passing between them. Under novocain anæsthesia the left central was twisted round through a right angle. No attempt was made to correct the infra-occlusion. The tooth was ligatured to the bar with brass ligature wire. I saw the patient a week later and found the tooth quite comfortable and fairly firm. There had been no pain, the gum was slightly red but there was no suppuration. The apparatus was removed a month later. The tooth was then quite firm and not discoloured. Thermal tests gave a doubtful response and suggested that the pulp was dead. (Fig. 4.) It seemed to me that having got thus far, I ought to try and get the left central into better position by correcting both the infra-occlusion and the obliquity of the root. In July, 1921, as a preliminary the frænum which extended on to the free border of the alveolar ridge, was dissected away under local anæsthesia. Bands were made to fit the right central and canine, and a bar soldered labially so as to get the greatest resistance. The left central was banded and a post soldered to the band extending parallel to the root as high as the lip sulcus allowed and with the end bent back distally. A hook was soldered to the band while the distal end of the bar on the right central was allowed to project free so as to act as a spur. From the fixed point on the right two elastics were attached, one going to the extremity of the post on the left central band and one to the hook on the band itself. The apparatus worked very well; the infra-occlusion was completely corrected while the obliquity was undoubtedly lessened. Owing to the holidays intervening, too great a movement occurred and when I saw the patient next in September, 1921, the left central was slightly inside the bite. This was easily corrected, and the next figure shows the result (Fig. 5). The patient was finally seen at hospital in February, 1922. No further treatment has been carried out, and after a year there has been no relapse. The left central reacts quite well to thermal tests but less briskly than the other incisors. There is no sign of discoloration of the tooth. It is quite firm and the gingival margin is intact. The tooth is still rather oblique, but the appearance of the patient who is present is better than the final model would indicate, and I feel that it would be an unwise adventure to attempt more.

There are two interesting features in this case. Firstly, the cause of the irregularity. Supernumerary teeth are commonest in the incisor region and often cause malocclusion. It is distinctly uncommon to find two such teeth present, while the deformity which was produced was very severe. Secondly, it is interesting to find that the left central still retains its vitality after having been

IRREGULARITY OF THE INCISOR TEETH CAUSED BY TWO SUPERNUMERARIES. WITH RESULTS OF TREATMENT.

By A. T. Pitts, M.R.C.S., L.R.C.P., L.D.S.

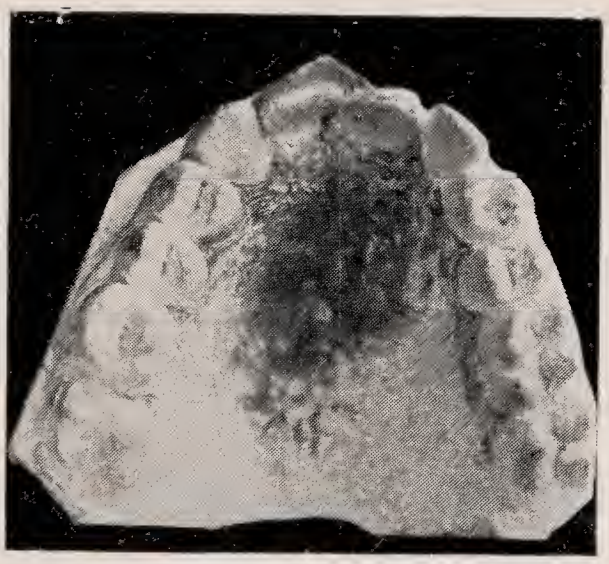


Fig. 5.

From the *Transactions* of British Society for the Study of Orthodontics.

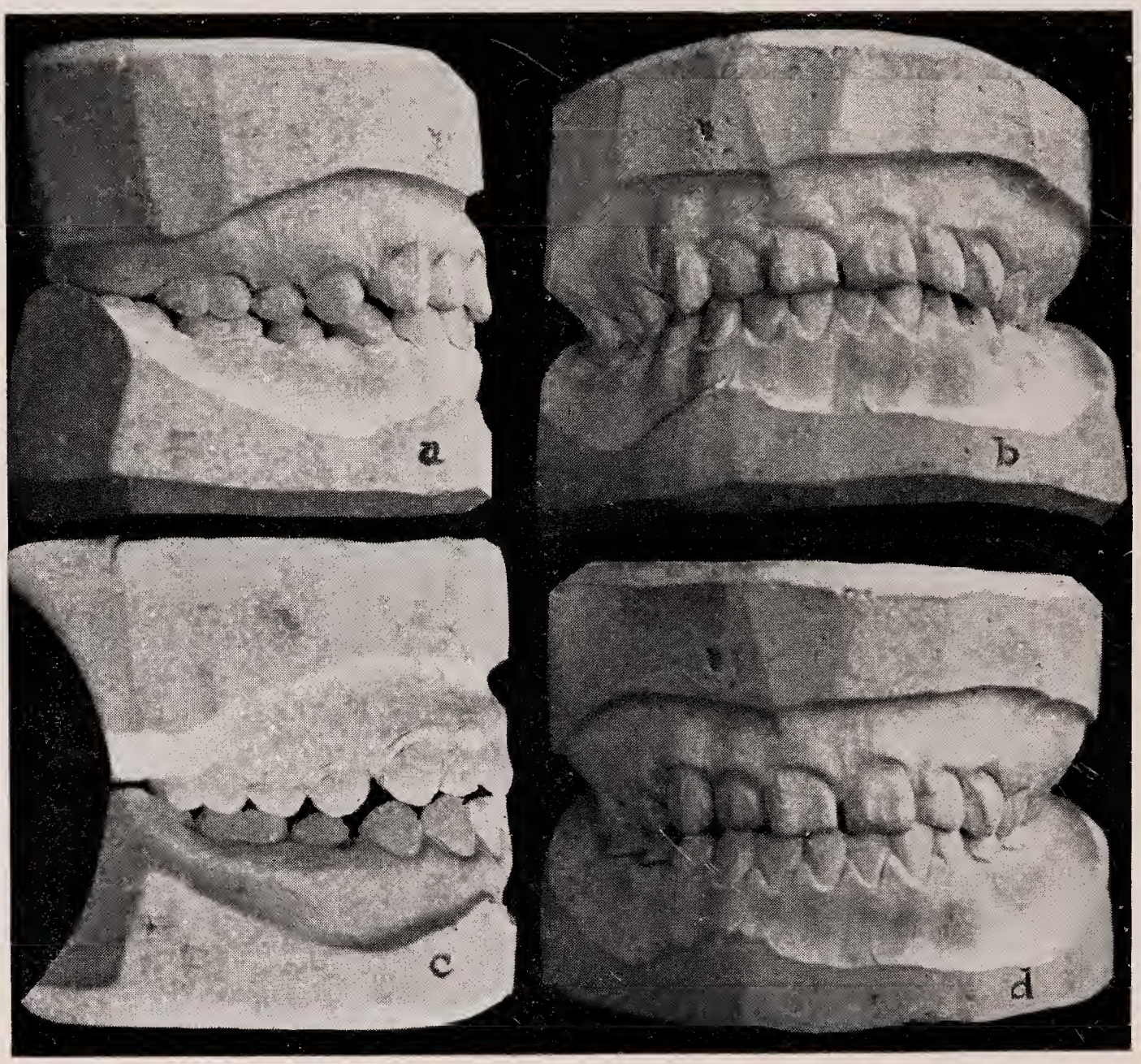
TO ILLUSTRATE MR. ROWLETT'S COMMUNICATION.

1. Prehistoric skull showing edge to edge incisor bite and molar and bicuspid contact with normal molar occlusion.

2. Normal occlusion which would permit occlusion of free movement.

3 & 4. Completed cases showing excessive overbite (from a work on orthodontia).

5 & 6. Jaws of children 8 and 18 months respectively showing the small amount of bony tissue around temporary teeth as they erupt and the consequent ease of change of position by mechanical or functional methods.



Casts of a boy of 12-14, showing occlusion and free occlusion.

Casts of temporary and permanent teeth of the same boy showing the excessive overbite in both dentitions.

a. Right side in occlusion.
b. Front in occlusion.
c. Right side free occlusion.
d. Front free occlusion.

Correct free occlusion means several points of contact in the different areas of the arches when the incisors are brought edge to edge.

twisted through a complete right angle, while the periodontal membrane which must have been completely ruptured by the immediate regulation, proved equal to the considerable strain involved in the gradual regulation carried out only four months later.

Mr. Warwick James demonstrated his method of dealing with cases where the bite is too close (described in a paper read before the British Society for the Study of Orthodontics, November, 1921). The method consists of the use of a bite plate allowing certain teeth left free, usually the first permanent molars, to rise until the bite is propped open. The most frequent type of case is where the occlusion is post-normal and the maxillary arch narrow, when expansion of this arch is carried out at the same time by the use of a jack screw (Badcock type with an additional guide) inserted in the bite plate.

Many of the members had difficulty in distinguishing the method described by Mr. James from that formerly employed when a simple bite plate was used. The most important point in the treatment by Mr. James's method comprises the fixation of the bite, when corrected, in such a manner that the teeth which have been allowed to rise cannot be depressed. In order to permit the premolars to rise to the same occlusional level as the molars, the same plate can be cut away over the second molar on each side, or perhaps better still by making a simple bite plate with the molars occluding and the front part of the plate engaging the incisors and canines, the premolars being left free.

A certain number of members seem to have failed, as was usually the case with the old bite plate, by not managing the proper distribution of pressure, and had permitted the molars to be depressed again. Many of the associated malpositions may become corrected in the process, but not infrequently additional treatment is needed.

Mr. Harold Chapman demonstrated the soldering and bending of auxiliary springs as practised by Dr. Mershon of Philadelphia, the whole operation for one spring occupying one minute.

Cases occur from time to time where the anchor bands with vertical tubes attached are cemented on the teeth and it is desired to obtain a model with those or similar tubes in correct position on it in order to repair the arch or make a new one. Mr. Chapman demonstrated by means of models, etc., the method described by Dr. H. A. Pullen of Buffalo, of obtaining such a model of the teeth with the vertical tubes in position on it exactly as they are in the mouth.

Mr. Chapman also showed models of a case in which the lower molars were inadvertently moved distally when it was desired to move the incisors forward. In the original condition the overbite was unusually great, the entire lower incisors and a portion of the corresponding gingiva being covered by the upper incisors, when the maxilla and mandible were brought into their closest relation.

In all probability the distal movement of the lower molars was brought about by the resistance offered by the upper incisors to forward movement of the lower incisors, combined with the fact that the appliance moving the upper incisors forward was not doing so as rapidly or efficiently as the lower appliance would have moved the lower incisors forward had there been no unusual resistance to such movement.

Mr. G. F. Cale Matthews demonstrated a simple idea for expansion anchor bands.

Mr. Bertram Samuel described a method of taking two-piece impressions in composition as advocated by Dr. C. McCoy.

Mr. W. Thew : " The use of Stainless Steel."

Mr. Harold Watkins : " How to Prove One's Ability to Adjust an Arch Correctly."

An ordinary meeting was held on Monday, November 6th, 1922, at 8 p.m.

The following new members were elected : Melville Davie, L.R.C.P. and S., L.D.S.Eng., 6, Carlisle Parade, Hastings, R. Marson Pearce, L.D.S.Eng., 21, Oil Mill Lane, Kingston-on-Thames.

Casual communications were given by Mr. W. J. May, Mr. Harold Chapman, and Mr. George Northcroft.

Mr. E. A. Rowlett read a paper :

SOME OBSERVATIONS ON THE PREVALENCE OF EXCESSIVE OVERBITE AND ITS POSSIBLE ETIOLOGICAL SIGNIFICANCE.

When I undertook to write a paper for this Society it was my intention to take as my title "The Etiology of Malocclusion." I soon discovered that the subject was too large a one for me to write upon usefully and that I had neither the time, the knowledge, nor the facilities for acquiring knowledge necessary for such a task.

In my clinical observations, however, I was struck by the very large percentage of mouths in which there was excessive overbite, and as I extended my somewhat shallow researches into the causes of malocclusion I was led to wonder if a clue to its ætiology might not be found by investigating this deviation from the normal.

It is the fruits of these observations that I place before you in the hope that they may in some small degree help us towards the goal of orthodontics, which is the elimination of malocclusion, or in other words the domination of normal occlusion.

There are no words in orthodontics more often used than the phrase "normal occlusion," and it is of vital necessity that these words should convey a definite and accurate conception to the mind of the user of them. Let us consider a few definitions.

Angle, who presented us with the working hypothesis which has made possible present day orthodontics, defines normal occlusion in the following words : "The normal relations of the occlusal inclined planes of the teeth when the jaws are closed."

As you know, Angle describes the first permanent molar as the key to occlusion and makes the correct occlusion of these molars the foundation of his classification ; he further describes in detail the relationship of the cusps of the upper and lower teeth and says that the upper central incisors overlap the lower central incisors to the extent of one-half. Dewey in his book entitled "Practical Orthodontia," 1915, describes the overlap as one-third instead of one-half.

It seems fair to say that this definition and description of Angle has been accepted by the majority of later orthodontists and has formed the basis of orthodontic teaching and practice.

I venture to suggest that orthodontists have missed an important point as a result of this definition of malocclusion and as a consequence have focussed attention upon what is not really the most significant feature of occlusion.

Let us consider the results of this definition, and by this I mean let us consider what the phrase "normal occlusion" conveys to the mind of the majority of dentists, in this country at any rate. What the ordinary dentist means by normal occlusion is something like this :—"That when the teeth are closed with the lower jaw as far back as possible that the premolars and molars are in normal

relationship, and that the arches are well formed with the upper incisors slightly overlapping the lower."

The conception is static, not even dynamic whereas since occlusion is only a means and not an end, the definition should be so far functional that it presents occlusion to the mind as a means of mastication.

Normal occlusion is essentially an occlusion of free movement as distinguished from traumatic occlusion.

Dewey's definition of malocclusion is good, when he describes it as the deviation from normal occlusion to such an extent as to interfere with the proper functions of the teeth; but one naturally asks, what is normal occlusion? I do not think a definition is successful even though it may be correct unless it results in conveying to the mind of the listener or reader a correct conception.

Normal occlusion of the teeth should mean the shutting together of the teeth in a normal manner or in a manner which accords with what is believed to be the natural law.

There is a normal occlusion for each position in the excursion of the bite, for instance when the incisors meet edge to edge when the lower jaw is pulled over to the left or to the right of the median line.

J. Lowe Young in a paper published in the *International Journal of Orthodontia*, 1917, seems to wish to accentuate this point when he says that normal occlusion implies that all the teeth in one jaw are occluding with all the teeth in the opposing jaw so as to furnish the largest area of grinding surface.

If I may venture to amend Angle's definition: "Normal occlusion implies the normal relations of the occlusal surfaces of the teeth during all positions of prehension and attrition of food." It is characterised in modern man by the cusp relationship described by Angle and by the fact that when the incisors meet edge to edge there is contact in the premolar and molar region.

I do not claim for this definition that it gives any new facts about normal occlusion, but merely that it lays stress upon what I believe to be the most salient point; namely, that normal occlusion is above all an occlusion of free movement.

Orthodontic specialists no doubt realise this fact and may give it due prominence in their treatment of cases, but I have not been able to find in the literature I have consulted that freedom of movement has been given the importance it would seem to deserve.

What then is the significance of this condition of excessive overbite, and how has it come about. Keith has drawn attention to the fact that in primitive man the incisors meet edge to edge, whilst the molars are in what is generally understood by normal occlusion; and although it has been suggested that as the teeth show signs of attrition, that in the unworn state there may have been a slight overlap, the edge to edge bite is accepted as a fact by anthropologists generally.

It appears from investigation that the overlap began to become a common feature about the time of the Saxons and is to be ascribed to a less strenuous use of the incisor teeth.

To day not only are overlapping upper incisors the rule, but excessive overbite is present in a very large percentage of mouths both in the permanent and in the temporary dentition.

W. Wallace, in a paper entitled "Normal Human Dental

Articulation," says, "Irregularity is much more apt to occur amongst the front teeth than in the molars behind," and draws attention to the fact that "In the process of mastication, if the central incisor teeth are observed it will be seen that the lower incisors actually pass from side to side transversely."

In primitive man this transverse movement of mastication caused even wear of all the teeth, including the incisors.

With the loss of function of the incisors it is possible to masticate the small pieces which are introduced into the mouth with very little inconvenience from excessive overbite.

The act of incising food, which in modern man needs a forward movement of the mandible, was performed in primitive man with the mandible in its posterior position.

It would be interesting to know if the power of protruding the mandible was possessed by primitive man or whether it has been acquired by his descendants.

Excessive overbite is present in a great number of temporary dentures that I have examined. I should say considerably more than 50 per cent.; but since patients are not generally seen before the age of three or four years, I am not able to say when it first shows itself.

It is possible that in bottle-fed children the lack of pressure on the alveolus and the erupting incisors may cause a disturbance of the normal relationship of the incisor teeth.

Certainly the little use to which these teeth are put must have a profound influence upon the occlusion; and as the accepted treatment for reducing overbite is a vulcanite bite plate, to encourage the biting of hard foods or other materials would seem a rational manner in which to prevent it. It is easy to see how an excessive overbite in the incisor region may result in post-normal occlusion, especially if the posterior surfaces of the upper incisors are a decided inclined plane.

I do not say that this is in all cases the sole cause but that it may be the deciding factor, and since this condition of excessive overbite is so prevalent it becomes a proportionately more important factor.

It is probable that once this condition has been established the forward movement of the mandible is seldom used; in ordinary mastication we have seen it is unnecessary, and in any case the lack of molar and premolar support would make the strain on the incisors a very severe one.

What, then, should be our treatment for this condition? The treatment should be; establish occlusion of free movement as early as possible and maintain it by functional means. This possibly means that we must give masticating exercises, and although this may seem strange to us at first, it is surely no more unreasonable than respiratory exercises. When the habit of correct respiration has been acquired the exercises are unnecessary and habit has become second nature.

The same rule would apply to exercises for mastication.

Overbite is the most common type of malocclusion, and by treating it in the temporary dentition before the eruption of the permanent teeth, and preventing its recurrence, we may prevent not only this form but other forms of malocclusion in the permanent dentition.

Sequelæ.

One of the most common results of excessive overbite is an intractable form of pyorrhœa. In the lower incisors the necks of the teeth may become denuded of gum and impinge upon the palate, and in these cases there is progressive loosening; or they may become inclined inwards, and it is then almost impossible to check the deposition of septic tartar on the lingual surface.

Sometimes painful sores are produced upon the tender mucous membrane just posterior to the necks of the upper incisors.

In the upper incisors pockets are formed interproximally by the wedging of food and by the traumatic occlusion of the lower upon the upper incisors; the latter are swung forward, and by rupturing the peridental membrane pockets are formed between the palatal alveolus and the lingual aspects of the roots. When these teeth are lost their restoration presents many difficulties to the mechanical dentist.

To briefly recapitulate: I put forward for your consideration the suggestion that in the problem of occlusion we have perhaps concentrated our attention too strongly upon the six year old molar and that we might with advantage give more thought to incisors and to occlusion of free movement. That by dealing with the deciduous teeth, and particularly the deciduous incisors, our work would be made more simple and our results more permanent, and finally that the best means of retention is by functional methods.

Before closing my paper I wish to acknowledge my indebtedness to Dr. Sim Wallace, whose principles I have adopted, and to Mr. Badcock from whose paper on overbite I have freely borrowed.

Discussion.

Mr. G. Northcroft: I congratulate Mr. Rowlett on his thoughtful paper, and I am in entire agreement with him that the length of the incisor overbite is a point of vital importance and hardly ever treated with the precision and study that it deserves. I also wish to congratulate the Society on its wisdom in having the papers printed and circulated before the meeting, as it gives one the opportunity of looking up authorities on any debatable points. I have had time to look up authorities. There is one point to which attention should be called —that of nomenclature. Unknowingly, Mr Rowlett introduces as new, a controversy that was settled years ago. He confuses the terms articulation and occlusion. H. A. Pullen in "Johnson's Operative Dentistry," 1908 edition, says: (I pass over the actual definitions "There are three distinct stages of articulation, Prehension,—Attrition—(he means Trituration) and Occlusion. Occlusion is the passive phase of articulation as compared with the active phases of prehension and attrition (trituration). Occlusion represents the static, and articulation the dynamic relation between the arches of teeth." Mr. Rowlett wishes us to have a new vision, and realise the forces of the mandible in motion, but there is no need to call this action occlusion, we already have the exact word in "articulation." Mr. Rowlett also implies that the excessive incisor overbite is a cause that has the same effect as our old friend the bite of convenience. I think that in Class II, Division II cases, the overbite so often present is due to the moulding of the upper arch over the already post-normal lower. I show one case to prove that excessive overbite is not always associated with post-normal occlusion. I am glad to see that Mr. Rowlett lays stress on "preventing the recurrence of overbite." I have been disappointed in the use of bite plates at too early an age. The bite may be opened temporarily,

but if the lower permanent incisors are not checked in their upward growth further difficulties arise, and I doubt if much good is gained by commencing this treatment for this particular purpose before the age of eight. I have not had time to inquire if there are any prehistoric skulls of youths not showing signs of attrition which still have an edge-to-edge bite. I am sceptical on this point. Bonwill always thought that there was a distinct relationship between the length of premolar and molar cusps, overbite, and compensating curves.

Mr. CALE MATTHEWS: Our thanks are due to Mr. Rowlett first for his courage in opening up this subject and secondly for the careful analysis of the knowledge we possess of this difficult condition apart from the point of view of treatment, from its etiological significance. However we may desire to dissent from the classification Angle has laid down, any discussion on occlusion has to start with his definite statement based on his observations of 1,000 cases. Whilst agreeing with the author in his idea of the ordinary definition of "normal occlusion" and also accepting his own interpretation of Angle's, I would venture to point out that he has omitted the principal feature in Angle's definition; and that is, that the relation of the maxilla to the mandible must be in conformity with the facial contour; these are my own words, but is the interpretation I always feel should be given to Angle's classification. If we take the varying types of facial contour, from the negro with his prognathism to the recessive retro-clinated appearance of the "Judy type," we shall pass through many degrees of overbite ultimately to edge-to-edge bite; at the same time the molar occlusion is constant if the relations of the maxilla and the mandible are in conformity with facial contour. I understand "'normal occlusion' to be the correct interdigitation of the cusps of the posterior teeth with their opponents and the overlap of the incisors and cuspids when the jaws are closed to bring the surfaces together; any deviation from this position on movement is an articulation of convenience or utility, and may vary according to the desire of the individual and is influenced by the amount of exercise which is given to the muscles of mastication." Overbite, providing there is no injury to the tissues, may be allowed to vary in accordance with the facial type but should not exceed one-third of the lower incisors as a normal definition. In looking at the masterpiece pictures of the greatest artists I have often endeavoured to visualise the dentures they possessed, and also, if they were smiling, what denture the artist would give them. Through the ages, art in sculpture and picture has been consistently constant in its realisation of the denture as an aid to facial beauty, although not showing the teeth themselves it is obvious that they exist in the anatomical sense. It is not clear to me what the author means in his term "occlusion of freedom" if he accepts the principle of cusp relationships which we all regard as correct. The establishment of "free movement" must depend on the strength of muscular action. If from any cause muscular development is retarded, the consequence must surely be towards an excessive overbite. Development should be most active in the posterior part of the jaws during childhood; the provision of such magnificent grinders as the first permanent molars shows us clearly where nature intends most of the work to be done. If injury happens to these teeth sufficient to cause the child to avoid using them, or they become misplaced through premature loss of temporary teeth, food is chosen which requires less effort of mastication and the inevitable result follows in the anterior part of the mouth. Less activity; soft, spongy alveolus with less bone growth posteriorly owing to lack of stimulation; hence the very sensible campaign of Dr. Sim Wallace in his advocacy of hard food stuffs which should materially help the avoidance of this condition. It must be remembered that the question of excessive overbite may also be due to this proportion of anterior teeth and their shape. Whilst the posterior teeth may be accommodated correctly mesio distally, it is possible that the arch

shape itself may so *squeeze* the anterior teeth that overbite is inevitable, and in the case of the permanent dentition, cause may often be found in the narrowness from *cuspid to cuspid.* The proportions of the teeth of the average denture are so exact that their accommodation is on definite lines and despite the anthropologists and the question of the lost incisors it is difficult to realise that this great change should have occurred in so short a time in the character of the occlusion. If the author's formula of the " occlusion of freedom " be accepted, it does not in any way negative the present diagnostic position of the first permanent molar, neither would it help in the correction of malocclusion. It is common experience that in a certain type of complete artificial dentures although an overbite may have existed in the natural denture, retention cannot be maintained if there is any overbite ; thus possibly showing the necessary freedom desired by Mr. Rowlett, which must be really muscular elasticity. Any interference with normal breathing may retard posterior development. The effort of mouth breathing *may so drag on the muscles attached to the posterior portion of the mandible and the tongue that the constant pressure, slight as it may be, would eventually have the effect of a brake on vertical growth.* This idea has been in my mind for some time, but I do not see any possibility of proving it other than the restoration of correct breathing by which time usually the mischief has been done. I think the etiology of overbite must be accounted for in the temporary denture by failure to function, such as artificial feeding and in the permanent denture as a sequel of the first condition possibly aggravated by premature loss of temporary teeth. The type of tooth seems also to invite this condition. My observations lead me to think it is commoner with the thin wedge-shaped tooth than with the well rounded tooth with the bold developed cingulum. I would in conclusion like to ask Mr. Rowlett if he has observed excessive overbite in people where there is free glenoidal movement as distinct from the incisive scissors action, and whether the scissor action which is the most convenient movement with these cases is Cause or Result ; also whether our advanced civilisation or refinement of manners in taking our food may not be an accessory cause of this result ? I again thank the author for his paper. The more this subject is studied the more difficult does it seem to give a logical reason for this increasing deformity.

Mr. Sheldon Friel : I would like to thank Mr. Rowlett for his very interesting paper on the etiology of too close bite. He has touched upon an important point a correct understanding of which must be the basis of all orthodontics, namely normal occlusion. There is no doubt that if one inquires closely into what different dentists mean by normal occlusion, one would get a variety of answers. I think a good deal of the confusion as pointed out by Dr. A. L. Johnson of Boston is because of the different meanings given to the term normal. Some people mean by it an ideal form that they consider is the ultimate goal to be reached. Others refer to normal as meaning typical or average, and yet others as that pertaining to the best functional form for that individual. It is this functional meaning of normal that should be adopted in orthondontics. It is certainly normal for us to have two eyes, i.e. the average of the species have two eyes, but what do you mean by a normal eye ? It is an eye that functions properly. It may be different in shape and size from other eyes, but if it fulfills the functions of the eye for that individual it is a normal eye, and so with normal occlusion, it refers to the best functional occlusion for each individual. It is impossible to lay down a hard and fast rule as to its exact form, or to the exact amount of overlapping of the incisors. A certain amount of latitude must be allowed. With our present amount of knowledge this ideal scheme as put forward by Angle is a working hypothesis from which to inquire further as to what deviations from it are still fully functioning occlusions. The etiology of too close bite is very difficult to fathom. Some

years ago I examined some fifty boys in a National School on the West Coast of Kerry. The diet of these boys is primitive, but I do not think it could be called a Sim Wallace diet. It consists of bread, both bakers' and home-made soda bread, potatoes, fish, eggs and tea. It is probable that these people are not adepts at the use of knives and forks, but still much biting with front teeth is not essential, yet they had excellently developed arches, a close bite was the exception. During the last few weeks I have been examining about fifty boys at an orphanage in Dublin. I have used dynamometers for testing the maximum strength of the bite between the central incisors and between the molars, the strength of the tongue, lips, and handgrip. The maximum pressure I obtained between the incisors was 77 lbs. pressure, and the minimum 15 lbs. Neither cases had a close bite. Or the 8 cases whose incisor bite was over 50 lbs., two had a close bite. Of the 8 cases whose incisor bite was under 25 lbs., two also had close bites. Of course the numbers examined are far too few, and a considerable time must elapse before any reliable statistics can be obtained. For this reason I do not think that sufficient proof has yet been brought forward to show that the group of muscles which brings the incisors together is the group mostly at fault. I quite agree that exercises are highly desirable for muscles under-developed, but we should be careful that we exercise the right groups of muscles and their opponents and also that the pressure used in our exercises, or that obtained by means of mechanical exercises should be proportionate to the strength of the muscle group that we wish to develop. It seems to me unscientific and dangerous for us to advise artificial exercises without having a very definite control of the forces that we are using.

Mr. CHAPMAN said he thought his remarks would add to the confusion of thought as he differed from Mr. Rowlett's view, as well as from that of some of the other speakers, in regard to excessive overbite being due to errors of growth or development in the incisor region, which he gathered was Mr. Rowlett's view. He said that in the majority of cases he believed excessive overbite was the result of imperfect and insufficient vertical development of the body of the mandible in the molar and premolar regions. He showed slides of mandibles at birth and eighteen months, taken from Cryer's " Internal Anatomy of the Face " in order to point out that the mandible approximately doubled in size in that short period, and he also pointed out that the growth of the mandible from birth to five years was approximately as great as the growth from five to twenty years. He therefore came to the conclusion that any error of growth between the ages of five and fifteen would not be so important or have so marked an effect on the occlusion as a similar error occurring between birth and five years, and if that were true he assumed that any error of growth between birth and eighteen months would be vastly more important in the production of abnormal occlusion than a similar error occurring in the later periods. Here it was pointed out by the speaker that he regarded overbite as the result of abnormal bone development, e.g. insufficient vertical development of the body of the mandible in the molar and premolar regions; he did not consider the teeth and alveolar process to be concerned in the cause of overbite beyond the fact that it might be due to their imperfect functioning, but of course the teeth and the alveolar process were the expression of the error of bone development elsewhere. As the alveolar process depends on the teeth for its presence and its position depends on the position of the roots of the teeth to a great extent, the speaker felt that teeth and process should be regarded as a unit which was situated upon the body of the maxilla or mandible, but the growth of the body of these bones was a process apart from the development of the teeth and process. In order to show how it was possible for these errors to occur, slides of the mandible were shown to bring out the points (1) that the powerful group of masticatory muscles was attached in the region of the ascending

ramus and (2) that the area of bone, which during the first year of life corresponded to the ascending ramus, at fifteen years of age was represented by the area of the horizontal ramus which corresponded to the position of the first permanent molar. He therefore assumed that if the masticatory muscles were not functionally active to a normal degree there would be insufficient and imperfect vertical development (and perhaps other imperfections) of the region to which the muscles were attached, and, as has already been mentioned, this area of attachment at one year becomes the area on which the alveolus containing the first permanent molar rests at a later period. In this manner excessive overbite might result. He also showed by means of slides a case in which not only did the fault appear to lie in the area referred to, but there seemed to be a similar error in the upper molar region, which might be due to imperfect antral development, for the upper incisors covered an amount of the lower gingiva, which was approximately equal to the length of the lower incisors.

Mr. Chapman also said that he would be inclined to say that smallness of the dental arches was the commonest of the various irregularities, but he would place excessive overbite as the second commonest from an examination of a small number of cases which were not selected, but taken in the order in which they presented for examination. He had ventured to disagree with Mr. Rowlett on some points, but nevertheless agreed with him that overbite was a very common form of irregularity and one which required considerable investigation, and, in his opinion, Mr. Rowlett had done the Society a real service in reading this paper and again calling the members' attention to the important problems discussed therein, and the occlusion of free movement which was so intimately connected with them.

Mr. A. L. Packham: I wish to thank Mr. Rowlett for his most interesting paper on this subject of overbite which is so extraordinarily common. In almost every child, in practically every case of dental irregularity which presents for treatment I have observed this factor of excessive overbite. The condition is associated very closely indeed with backward position of the mandible, with mouth breathing, and often with narrowing of the upper dental arch and protrusion of the anterior teeth. Owing to this commonness of the condition, I feel inclined to welcome Mr. Rowlett's amendment to Angle's definition of normal occlusion and especially the insistence of the fact that when the incisors are edge-to-edge the molars are also in contact. So far as the etiology of the condition is concerned there would appear to be two important factors: (*a*) Lack of function of the incisor teeth, in that these teeth are not necessary for the biting off of morsels of food. Knives and forks have taken their place in our civilized diet. (*b*) The abolition of the negative pressure (normally present in the mouth when the lips are closed) when the lips are kept apart from any cause, e.g. mouth breathing, thumb sucking and other habits. Mr. Warwick James had pointed out that when this negative pressure is replaced by atmospheric pressure the weight of the structures attached to the mandible (the tongue and larynx) pulls the jaw backwards. When this occurs the lower incisors come well behind the upper ones, and the molar teeth do not erupt to their full height, thus producing a condition of excessive overbite combined with too close a bite. I would like to ask Mr. Rowlett what evil effects are produced by leaving the condition untreated. It is obvious that the possessor of such a bite has an inefficient masticating apparatus, although, as the author has pointed out, no difficulty would be met with, in the mastication of our artificially prepared food of to-day. It is also true that the teeth are not fully erupted—do not project through the gum to their full height. This means that the gingival trough is deepened. I would like to emphasise my belief that mouth breathing is the chief factor. I feel that this condition is the cause of the " intractable form

of pyorrhœa" mentioned by Mr. Rowlett, rather than the mechanical wedging of food in between the upper anterior teeth.

Mr. ROWLETT: Before replying to the questions, I should like to thank the members present for the manner in which they have received my paper. It is impossible to answer all the questions in detail, time does not allow and some of them require a larger knowledge than I possess. But it may remove misconceptions if I endeavour to make clear my idea of malocclusion. I have tried to consider malocclusion rather as one considers disease. In disease as we know two factors must always be borne in mind, infection and resistance; these two factors are always present even in health, but in health the resistance overpowers the infection, whilst in disease the infection has overcome the resistance. So in deformities, I have considered the two factors of normal development and adverse environment and habits; when the forces of normal development are strong enough to overcome faulty environment or habits, a normal denture results. When the abnormal environment is too powerful for the normal development, deformities are produced. Further, since the attention of skilled orthodontists is impossible for the great proportion of the population, I have tried to investigate these faulty environments and to work out a method by which the three great factors of health may be utilised namely, the air we breathe, the food we eat, and the exercise we take. This is not to minimise the value of skilled orthodontists, nor will it meet all cases, but it seems to me that it should never be lost sight of. Mr. Northcroft is of course right when he says that occlusion denotes a static condition and articulation a dynamic condition, it is so stated in Norman Bennett's book on dental surgery. I think, however, that the meaning that has been assigned to the word occlusion is unfortunate and that as division means the act of dividing, so occlusion should mean the act of occluding. In reply to Mr. Badcock and to Mr. Friel, I am suggesting masticating exercises which are demanded by the organism for its natural development, particularly in the first two years of life. I do not propose that knives or forks should be abolished, but if the habit of what I have called free occlusion was once acquired, it might be maintained by the ordinary methods of feeding which obtain in civilised communities. In any case up to the age of leaving the nursery, children might be given crusty bread as a rule and encouraged to bite it with the incisors. I do not think that the mere pulling of a piece of rubber by the incisor teeth could be expected to reduce excessive overbite once it is well established, I look upon functional methods as methods of prophylaxis and maintenance of normal occlusion which has been established by mechanical methods. With regard to mouth breathing, I am of the opinion that correct respiration and consequent correct carriage of the head and mandible has a very definite influence upon normal occlusion and articulation.

THE Annual General Meeting of the British Society for the Study of Orthodontics was held at 11, Chandos Street, Cavendish Square, W., on Monday, December 4th, 1922, at 8 p.m. In the absence of the retiring President, Mr. SIDNEY SPOKES, Mr. LEWIN PAYNE occupied the chair.

Mr. J. H. BADCOCK produced the Report of the Education Committee.

REPORT OF THE EDUCATION COMMITTEE TO THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS.

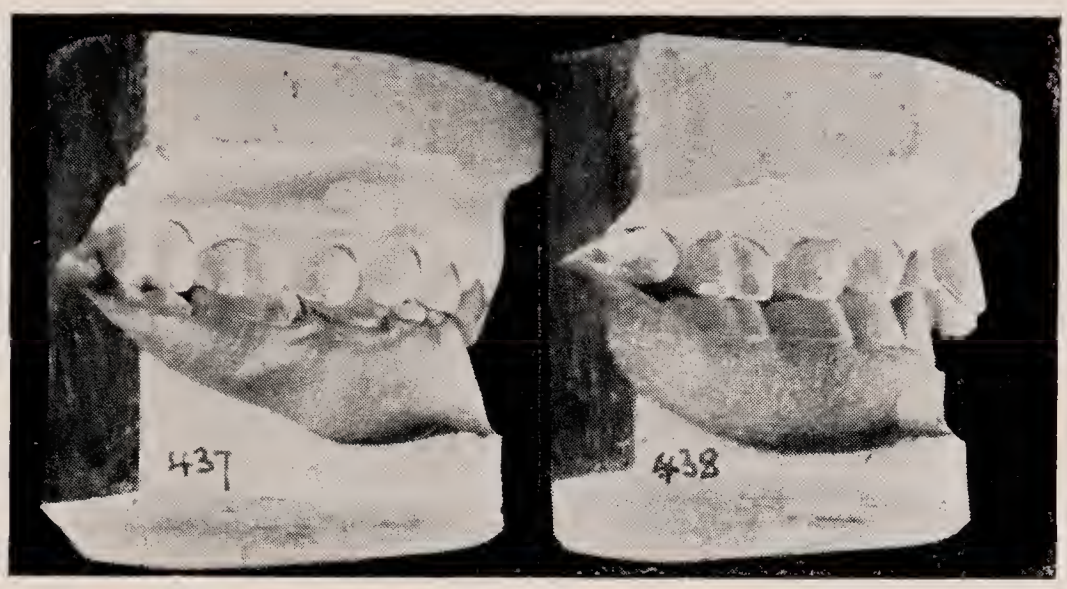
List of Members of the Education Committee: J. H. Badcock, *Chairman*; Norman G. Bennett, F. Bocquet Bull, Harold Chapman, Sheldon Friel, G. F. Cale Matthews, H. T. A. McKeag, G. Northcroft, J. Lewin Payne, Sidney Spokes; A. T. Pitts, *Secretary*.

TERMS OF REFERENCE.—To consider the present method of teaching orthodontics in Great Britain and Ireland, to report thereon and to make recommendations, if thought fit.

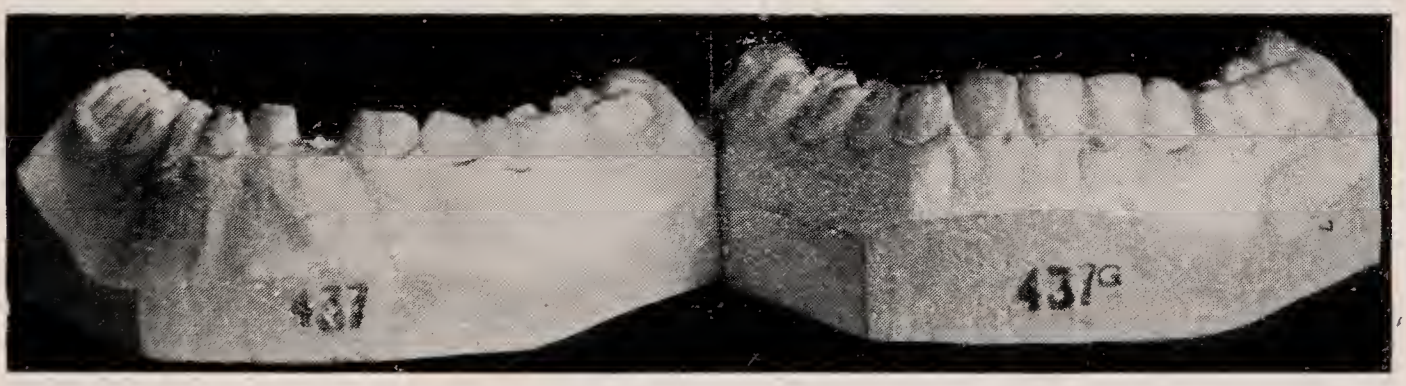
TWIN CASES.

Mr. George Northcroft: I add three to the other twin cases shown—two male pairs and one female pair. These all show individual varieties.

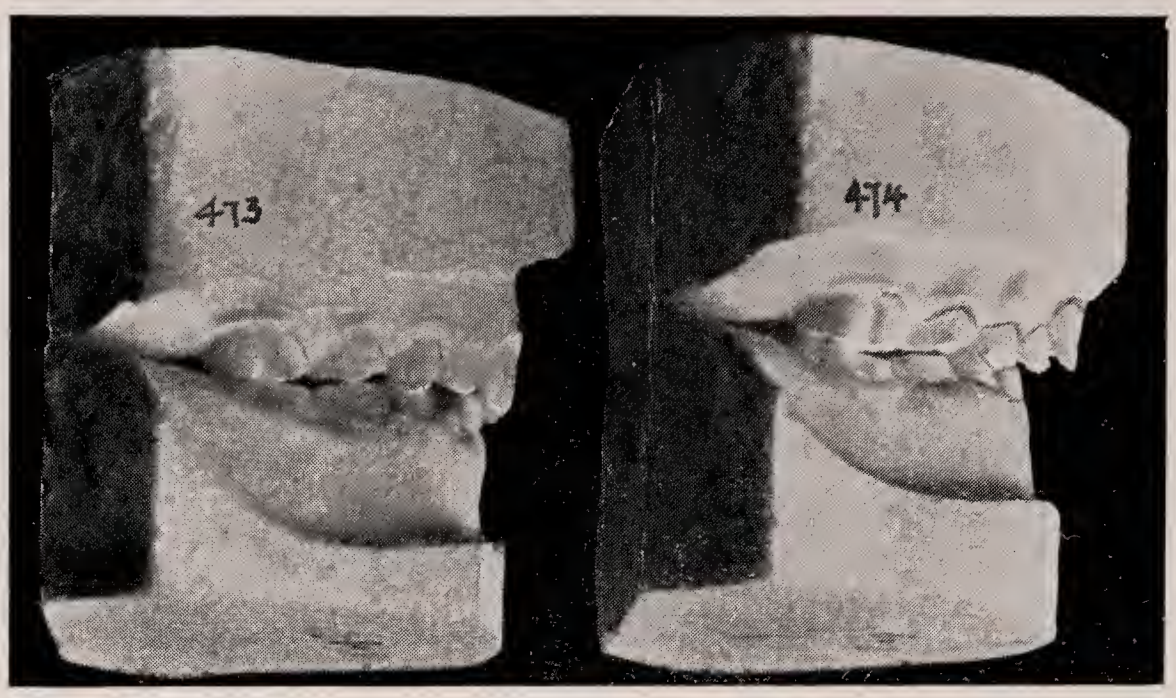
Case 1—Male twins—Age 7



Show teeth in different stages of eruption: one decidedly post normal; the other marked overbite, slightly post normal, has central and lateral geminated (437), which has no effect on $\overline{12}$ as shown in model 437G.



Case 2. Male twins. Age 6 years 3 months.

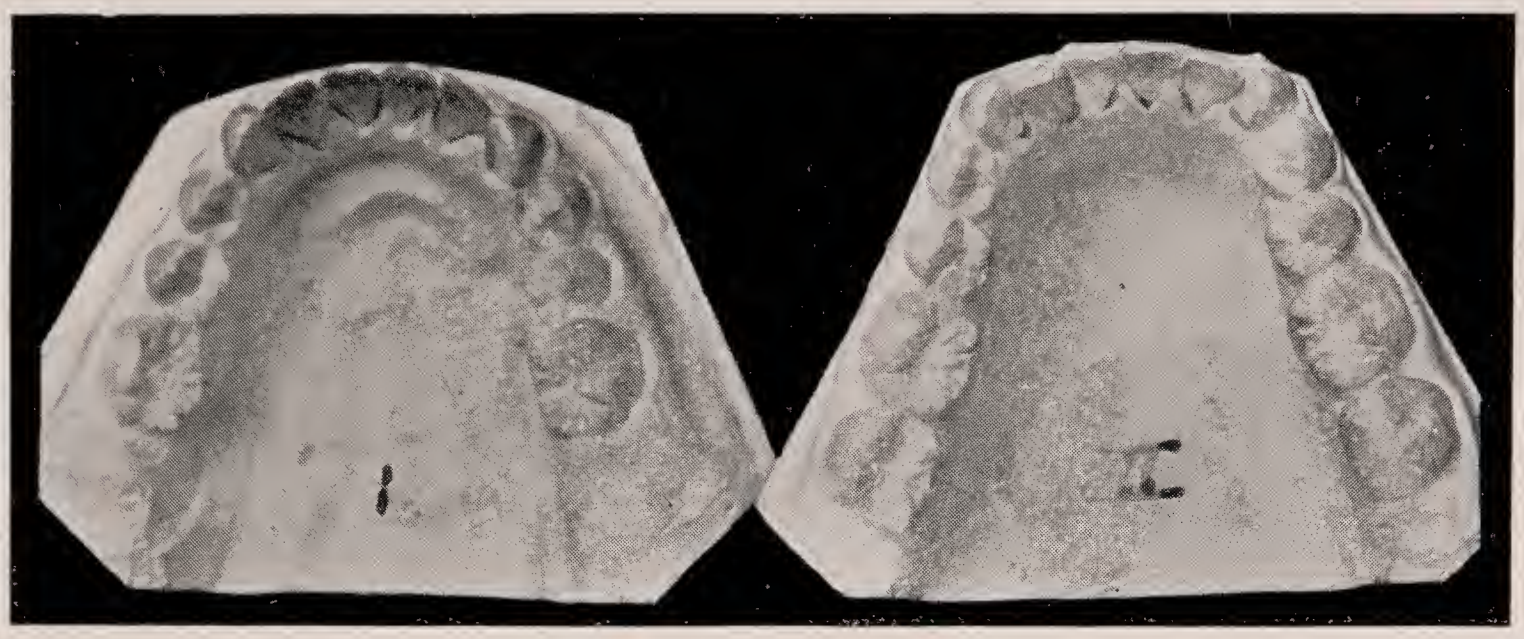


Both extremely well-developed upper arches. Neither have erupted first permanent molars (473, 474). Eruption in one case slightly in advance, one far more distal in occlusion with greater overbite and protruding incisors. The two cases might be said to foreshadow Class I, divisions I and II respectively.

Case 3. Female twins. Age 7.

Both normal antero posteriorly. Periods of eruption differ (91) in occlusion. In one right lower first premolar (91C, 91D) space lost by early extraction of septic D. Space apparently regained, but really at sacrifice of imbrecation of incisors. (Models marked I and II.) The

other child never treated. 90 and 91, marked difference in shapes of palates. 91D compared with 91C shows an interesting collapse at 16.8 of the untreated upper arch after puberty. Is this due to some disharmony of the harmon es ?



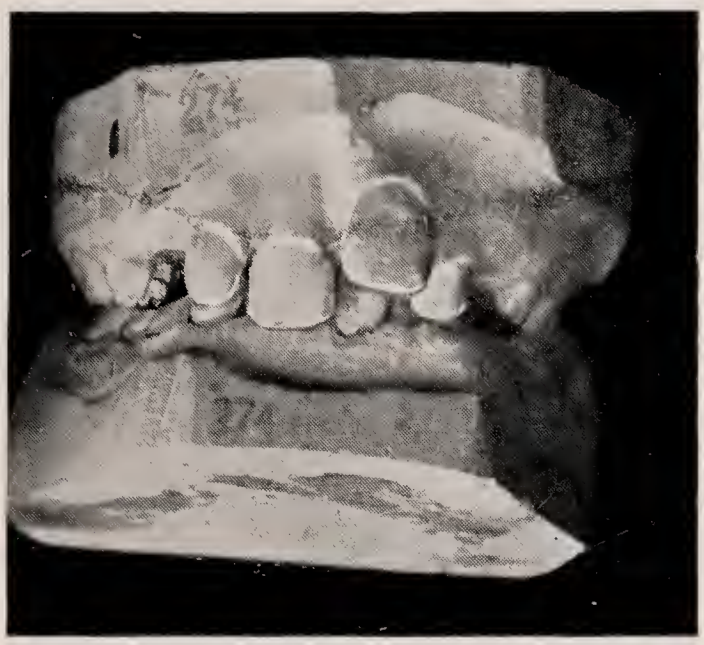
TWINS SHOWING A SIMILARITY OF MALOCCLUSION.

Mr. Harold Chapman's Cases.

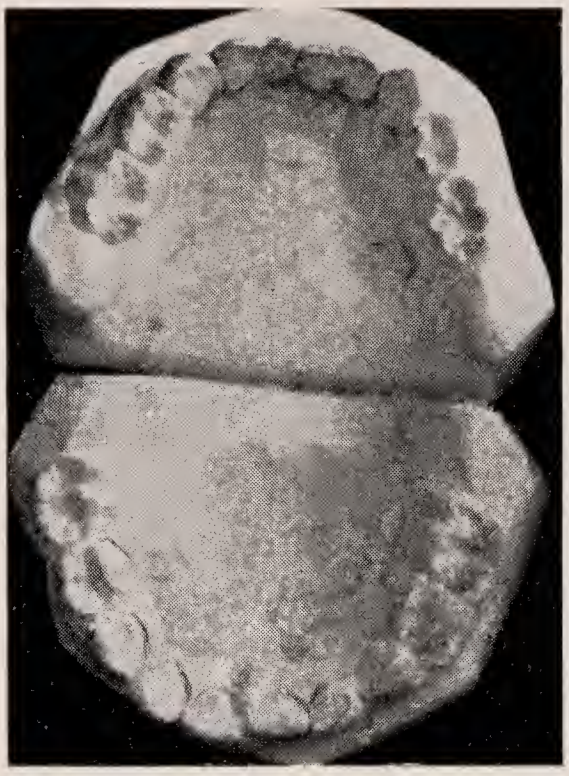
The models of two boys aged 12 years and 8 months. Both cases were examples of Angle's Class II, Division II, although there was great prominence of one central upper incisor in both cases, but in one it was the right tooth and in the other the left. The overbite in both cases was excessive, markedly so in one, to the extent that the lower gingival margin was well covered by the upper incisors in the position of occlusion. In addition, there was crowding of both arches in both cases, though this was more severe in the one where there

was the more overbite. This latter case was treated by extraction of the two first upper premolars and the left lower lateral. The other case was treated by retention of all the teeth, but in neither was the distal occlusion treated.

Models were shown of the cases after treatment (cases 273 and 274), exhibiting good alignment of the teeth at the age of 16.



MR. CALE MATTHEWS' CASE AT 6 years 9 months.



Breast fed for 4 months, when lactation ceased suddenly owing to shock, and the child was artificially fed. She is a robust healthy child, the third of four who do not present the same robust condition and who were all entirely breast fed.

The point to be observed is the complete Temp. dentition at this age without the eruption of the first permanent molars.

Mr. NORTHCROFT thought Mr. Cale Matthews' case an interesting one, but it could hardly be called "normal," as there was undoubted proclination of the upper incisors, and a lack of spacing in both the upper and lower jaws which should occur at this age The non-eruption of the 6, year old molars at 6 years and 9 months was rare, but by no means unique.

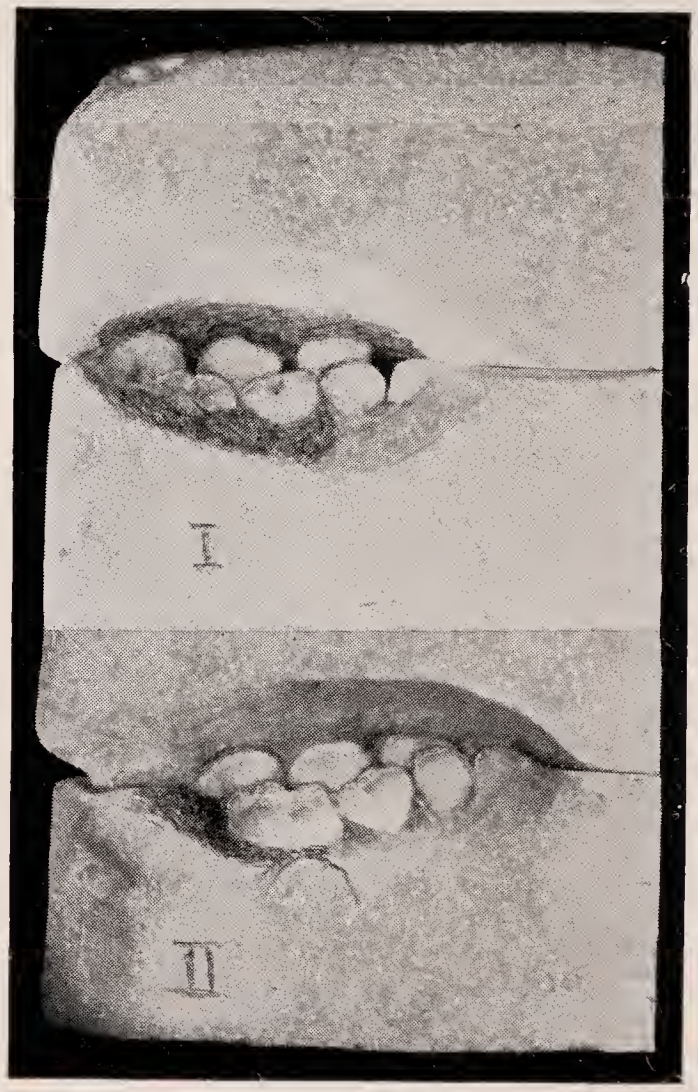
Mr. W. T. MAY: I have here models showing the occlusion of the temporary molars of two twin boys.

You will see that they present an exactly similar irregularity, viz. :—

The second lower left temporary molar bites lingually to the upper in each case. The occlusion in other respects is normal.

In my experience this simple irregularity is not at all common in temporary teeth.

The boys are extraordinarily alike in general appearance and in each case it has been necessary to fill a crown cavity of exactly the same size in the right upper first temporary molar, obviously due to a fault in the development of each tooth. All their other teeth are sound.



1. *The Need for Orthodontic Treatment and the Results arising from Lack of Treatment.*

Irregularities of the teeth are frequently so gross as to constitute an obvious defect of feature often accompanied by perverted respiratory function, impaired biting power, and an increased liability to pyorrhœa and dental caries.

2. *The Present Deficiencies of Treatment.*

Admitting the necessity for the treatment of such cases, how is it met ?

So far as a large section of the population is concerned, it is not met at all. A great number of children of the poorer classes do not receive any treatment. In the dental hospitals only a small fraction of those requiring attention receive it ; in the school clinics such treatment is rarely undertaken except in so far as extraction of the teeth, unaccompanied by any supplemental regulation, suffices.

With regard to treatment in private practice, it would be a mistake to consider that the facilities for orthodontic practice are co-extensive with the number of practitioners. Actually many cases which could and should be treated, are not, even when the parents are willing to have it done. This branch of practice is not congenial to some dentists for various reasons, while there are others who would like to carry out orthodontic treatment but feel diffident of their ability.

Orthodontics is admittedly a branch of dentistry which not only calls for high technical skill, but also needs much experience in diagnosis and prognosis, and although many dentists may feel themselves competent to carry out the details of treatment, they do not always feel able to make the preliminary diagnosis which involves a decision as to the methods to be employed.

The student qualifies, knowing less of orthodontics than of any other branch of dentistry.

It stands somewhat apart from the rest of dentistry, and the evolution in skill and knowledge which every dentist may reasonably hope for, may leave his knowledge, of orthodontics stationary.

3. *The Desirability of Instituting Special Instruction in Orthodontics.*

It is desirable that special instruction should be given in our teaching schools so that the student may at least know the elements of the subject. Knowing these, he will have a basis on which to build, and if he so desires, can set out to become specially skilled in orthodontics. If his desires should not lie in that direction, he would still be able to recognise his limitations in regard to difficult forms of malocclusion and the possibility of their treatment by those with a wider knowledge of the subject.

Out of this arises the question as to whether one member of the hospital staff should be entrusted with the whole of the teaching of orthodontics so that, in effect, he becomes the orthodontic specialist on the staff, or whether all members of the staff should take their turn in treating orthodontic cases and giving clinical instruction on their visiting days. In a few dental schools the former method is in vogue, but in the majority all members of the staff are, in theory, equally responsible for orthodontic treatment and instruction.

The Committee feels that there should be a member of the staff

in charge of the orthodontic department, responsible for all treatment of the patients. The main body of the teaching to the students, both theoretical and practical, would naturally fall to this member of the staff. At the same time the Committee is of the opinion that it would be unwise to debar other members of the staff from teaching. This could be arranged without lessening the administrative authority of the dentist in charge of the orthodontic department.

The Committee suggests the following as a Model Scheme of Undergraduate Education in Orthodontics :—

A course of instruction in orthodontics should be compulsory and should include technical work, lectures and clinical work, as follows, viz. :—

1. *Technical work* (*in the laboratory, accompanied by lecture demonstrations*).

This course should consist of :—

(*a*) Casting impressions and the preparation of the model.
(*b*) Free-hand soldering technique and wire bending.
(*c*) The construction of plain bands to fit natural teeth, by direct and indirect methods.
(*d*) The construction of simple appliances, removable and fixed, on models and phantoms respectively.
(*e*) The construction of various devices to retain removable appliances.

2. *Lectures on the Theory and Practice of Orthodontics.*

These lectures should form a special course and not be included in the course of lectures on Dental Surgery. This is desirable so that orthodontics may not be submerged by the other subjects, which must inevitably form the greater part of the syllabus of lectures on Dental Surgery, and to give it a position in the curriculum worthy of its importance.

With regard to the lectures themselves, it is obvious that their arrangement and subject matter must vary with the views of the lecturer; nevertheless there is common ground as set forth in the following syllabus :—

1. The definition and aims of Orthodontics.
2. A short history of the subject.
3. Definition of terms and phrases.
4. Morphology.
5. Normal development, growth and relationship of the jaws and associated bones and teeth and the natural forces which influence them.
6. Forces governing the eruption and arrangement of the teeth.
7. Normal occlusion and the factors producing it.
8. Normal variation.
9. Effect of function on form and growth.
10. Etiology of malocclusion : (1) Hereditary causes.
    (2) Congenital ,,
    (3) Pathological ,,
    (4) Functional ,,
    (5) Dietetic ,,
    (6) Local ,,

11. Models, X-rays and photographs.
12. Diagnosis and Classification.
13. Prognosis.
14. Treatment : (1) Preventive.
(2) Remedial. (*a*) Surgical, (*b*) Mechanical, (*c*) A combination of both *a* and *b* } Retention.
15. Factors influencing the choice of treatment.
16. Case recording, charts, and preservation of data.

3. *Clinical Work.*

The student should hold a dressership of not less than three months in the orthodontic department.

This should comprise instruction in :—

(*a*) The taking of impressions in plaster and other materials.
(*b*) Diagnosis and charting.
(*c*) Treatment by extraction.
(*d*) By surgical methods other than extraction.
(*e*) By appliances.
(*f*) By a combination of any or all methods (*c*), (*d*) and (*e*).

At the end of each course of lectures a class examination is desirable.

It is earnestly recommended that greater stress should be laid on this subject, and that orthodontics should form a separate subject in the examination for a diploma or degree.

Post-graduate Instruction in Orthodontics.

There should be facilities for post-graduate instruction in orthodontics in connection with all dental schools. Post-graduate teaching might be of two classes :

(*a*) As for undergraduates, with such modifications as might be necessary to meet special conditions.
(*b*) A more detailed course for those fitted to receive it.

Courses for short periods held at times which might be most convenient to dentists in practice, would probably be found the most suitable arrangement and meet a much-felt want. This would necessitate special classes in practical and theoretical work apart from those held for the benefit of the students.

(Signed) J. H. Badcock, *Chairman.*

APPENDIX.

The following expanded syllabus is suggested as a guide for teachers and may be varied to suit the curricula of various schools and examinations, e.g. the L.D.S., B.D.S., etc. The numbers of the headings in the appendix will be found to correspond with the numbers in the model scheme.

1. Technical Work in the Laboratory, Accompanied by Lecture Demonstrations.

The taking of plaster impressions, e.g. one student by another student.

Casting impressions and the preparation of the models.

Free-hand soldering technique and wire bending, e.g. soldering a circle of wire inside a square inside another circle.

The construction of plain bands for anterior teeth.

Labial "pull-to" joint or "squeeze" joint; lingual "pull-to" joint, "overlap" joint.

The construction of plain bands for posterior teeth by the (i) direct method (ii) indirect method.

The construction of simple appliances, removable and fixed, on models and phantoms.

The construction of various devices to retain removable appliances.

2. LECTURES ON THE THEORY AND PRACTICE OF ORTHODONTICS.

1. *The definition and aims of Orthodontics (Dental Orthopædics, Odonto-Prosopic Orthopædics) :—*

Orthodontics includes the study of the growth and development of the jaws and face particularly, and the body generally, as influencing the positions of the teeth. The study of the action and reaction of internal and external influences on this development, and finally the prevention and correction of arrested and perverted development. The aims of orthodontic practice are to obviate the evils set out in the first part of this report, and should be both preventive and curative.

References : Nos. 1, 2, 3, 4.

2. *A Short History of the Subject.*

References : Nos. 5, 6 7.

3. *Terms and phrases* should be defined as they arise, special attention being paid to the following terms :—

"Morphology," "Growth and Development," "Function," "Physiological and Chronological Ages," "Diagnosis," "Prognosis," "Heredity."

Great confusion results from the loose use of such terms, both in understanding problems and in conveying ideas to others.

4. *The Morphology of the Deciduous and Permanent Teeth :—*

A knowledge of the form, grooves and cusps of the teeth is essential in the study of occlusion.

References : Nos. 8, 9, 10, 11.

5. *Normal development, growth and relationship of the jaws and associated bones and teeth and the natural forces which influence them.*

Embryology of the Face and Jaws ; showing how particular forms in later life may represent survivals of embryonic stages.

Anatomy of dental tissues, cementum, periodontal membrane, alveolar and basilar bone; plasticity of bone; bone limited as to its possibilities of growth by heredity, but dependent as to development on function.

Wolff's Law.

Oppenheim's experiments.

Physiology of the above tissues.

References : See No. 6. *(infra)*

6. *Factors influencing the eruption of the teeth.*

Factors influencing the arrangement of the teeth

e.g. { Approximal contact points. Inclined planes. Muscular pressure.

References : Nos. 2, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 40.

7. *Normal occlusion and the factors producing it.*

Law of Occlusion :—

Occlusion, the basic principle of orthodontics; Demonstrate the functional significance of the surface detail of each tooth.

Meaning of the word "Normal."

"Normal" for the species.

"Normal" for the individual.

The term "Normal" can be used with so many different meanings that it is desirable to have one fixed meaning when it is used in reference to orthodontics, i.e. "Functional Standard."

Occlusion : Hypothetical, typical, individual.

Heredity :—

1. Weissman's Theory; Mendelism; Neo-Lamarckism.
2. Inborn and acquired characters; environment.
3. Mutations and reversions.
4. Variations.
5. Quantitative and Qualitative, Continuous and Discontinuous Variations.

References : Nos. 2, 18, 26, 27, 28.

Habit :—

Tendency to repetition a normal characteristic of living tissue. Influence of habit on function a large factor in determining development.

References : No. 29.

8. *Normal Variation.*

Individual occlusion a problem of normal variation.

Application of Law of Variation lies in distinction between individual variation and malocclusion.

References : Nos. 23, 24, 25.

9. *Effects of function on form and growth.*

References : Nos. 20, 40.

10. *Etiology of malocclusion.*

1. Heredity.
2. Congenital conditions.
3. Pathological conditions.
   Effects of Constitutional Diseases.
   The effect of abnormal internal secretions on growth and development of the teeth and jaws.
4. Functional causes. Habits. Muscularity and methods of testing it.
5. Diet considered chemically and physically.
6. Local conditions which interfere with the development of the jaws and alignment of the teeth.

References : Nos. 1, 2, 18, 33, 34, 43.

11. *Models, X-rays and Photographs.*

References :

12. *Diagnosis and Classification.*
Classification of malocclusion :—
Angle's, Bennett's, G. Villain's.
Terms used to denote malocclusion.
Methods and instruments employed, e.g. :—
Prosopometer. Symmetroscope.
References : Nos. 1, 2, 18, 30, 31, 32, 32A.

13. *Prognosis.*
Age, Heredity, Social conditions, Health and Personal characteristics.

14. *Treatment.*

1. Preventive.
   (*a*) Care of deciduous dentition.
   (*b*) Extraction of deciduous teeth.
   (*c*) Splints after loss of deciduous teeth.
   (*d*) Cure of bad habits.
   (*e*) Surgical (adenoids and tonsils, etc.).
   (*f*) Diet.
   (*g*) Exercises.
2. Remedial.
   (*a*) Surgical. Extraction, immediate rotation and translation.
   (*b*) Mechanical.
   Mechanical principles employed in orthodontic appliances.
   Action and reaction.
   Resultant of forces.
   Levers, orders I, II, III.
   Elasticity.
   Inclined planes.
   Wedges.
   Anchorage : Definition and application.
   Simple, stationary, reciprocal, etc.
   Relation of the physiology of dental and associated structures to the design of orthodontic appliances.
   Physiology of tooth movement.
   Necessity for minimum interference with function.
   Appliances for the development of normal function.
   Materials used in fixed and removable appliances.
   Properties of materials as applied to various purposes.
   Exercises.
   (*c*) A combination of (*a*) and (*b*).
   The importance of hygiene during treatment.

References : Nos. 16, 40, 41, 42.

15. *Factors influencing the choice of treatment.*

1. Age.
2. Attendance.
3. Health conditions, dental and general.
4. Social conditions.

References : No. 42A.

16. *Case recording, charts and preservation of data.*
References : 18 etc.

3. Clinical Work.

This should comprise instruction in :—

(*a*) The taking of impressions in plaster and other materials.
(*b*) Diagnosis and charting.
(*c*) Treatment by extraction.
(*d*) By surgical methods other than extraction.
(*e*) By appliances.
(*f*) By a combination of any or all methods, (*c*), (*d*), and (*e*).

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Discussion.

Mr. J. H. Badcock (Chairman of the Committee on Orthodontic Education), presenting the above Report of the Committee, said the Committee addressed a questionnaire to all the teaching bodies asking for information as to the amount of orthodontic teaching given by them, what it consisted of, and so on, and not until they had acquired a considerable amount of information on such points did they commence making any constructive proposals. When they did so, however, they went into the matter very thoroughly, as he thought the members would agree.

The report was, he thought, self-explanatory. It consisted of two parts, the report proper and an appendix. The report proper dealt with the matter in general terms, while the appendix went rather more into particulars. It was thought that the appendix might be useful to teachers who were preparing lectures or courses of instruction on the subject, and the Committee was very anxious to give them all the information they might require without attempting to dictate in any way as to what should or should not be taught. The Committee realised that the teaching of any subject had to be left to the teacher, and its aim had been to supply him with information which might be useful to him in setting to work on his task.

Not only was the teaching of the student dealt with, but, as would be seen, there were recommendations for the teaching of post-graduates. It was very desirable that some post-graduate teaching should be available in this country.

The Chairman said all the members of the Society had received the report by post, and no doubt had read it carefully. It seemed to him a most excellent one. It might seem a little egotistical for him to say that, seeing that he was a member of the Committee, but none of the credit was due to him personally; he had merely been a looker-on while others did the work. The burden of the work had fallen mainly on three or four members of the Committee, but, he thought the

Committee would agree that the biggest part of it had been undertaken by Mr. Badcock, the Chairman of the Committee, and by Mr. Pitts, the Hon. Secretary. The work which they had done, and which was so well described in the report, would remain of value for many years to come. The more one studied the report the more one realised the immense value of the material therein contained, and the fact that it had not been put together hurriedly, but that each item had been carefully discussed and gone over again and again made it of far greater value than if it had been merely the product of a few weeks' or a few months' work.

Dr. SIM WALLACE said the report might be regarded almost as a classic, and supplied a want that had been long felt in this country. He suggested that instead of criticising it the members should unanimously adopt it.

Mr. CALE-MATTHEWS said he was not in a position to criticise the report, having been a member of the Committee which drafted it. He agreed with Dr. Wallace that it might be regarded as a classic on the subject with which it dealt, and it had already been of infinite value to him in his work during the past session.

Living so far from London, he had only been able to afford slight help to the Committee by giving them his experiences and methods of teaching. The great value of the report lay in the references. It was often difficult to prove one's point with the stray material usually at hand, and a list of references such as was given in the report was therefore of extreme value. He regretted that the present meeting was not more representative of the teaching bodies in London ; he had imagined that the meeting would be a crowded one, and that representatives of the schools would have attended in force to help in passing the report. Possibly they would discuss it amongst themselves and formulate their schemes upon it.

Mr. W. W. JAMES pointed out that the clinical work outlined on pages 3 and 7 was practically the same, except in regard to one item, the taking of impressions. On page 3 the clinical work for students included : " (*a*) The taking of plaster impressions," while on page 7, for post-graduates, the work was given as " (*a*) The taking of impressions in plaster and other materials." He thought the position of the two should be reversed. (This error of page 3 has been corrected).

Mr. A. T. PITTS said that as one who had had a small share in the preparation of the report, it would ill befit him to say anything about its merits, while for the same reason he did not propose to draw attention to its demerits ! To anyone who had enjoyed the opportunity which he himself had had of studying the raw material on which the report was based, namely syllabuses, reports of teaching and so forth from all over the country, it would be very obvious indeed that the standard of orthodontic education in this country was not very high. With some exceptions, the standard in a great many of the schools was low, and in some, indeed, there did not appear to be any special teaching of orthodontics at all. He did not think this country was peculiar in that respect ; he believed in some of the American schools the students did not take any part in the treatment of malocclusion, a point to be remembered at the present time, when everyone vaunted American dentistry at the expense of English. The report did not exhaust the subject, but it was obvious that the Committee had to go tactfully to work, and not arouse local jealousies. If the detailed syllabus of instruction seemed a little colourless it was because the Committee particularly wished to avoid pinning themselves to any particular school ; and he thought he might say without flattery that that had been accomplished. The syllabus for lectures on the theory and practice of orthodontics could be taken with a clear conscience by either Dr. Angle or Sir Frank Colyer for a course of lectures, even though their lectures might be poles asunder. The report only touched slightly on the question of post-graduate teaching, but he thought and hoped

that that would grow out of increased facilities and improvements in undergraduate teaching, because it was of the greatest importance at the present time that there should be instruction for post-graduates. He hoped the report would not be still-born, but would have some influence. It had been of great value to him personally, and he had learned more about the subject through working on the Committee than he knew before, so that from his own point of view the report had been well worth while. He hoped some of those who represented the various schools would discuss the report; he was sure the Committee would welcome criticisms.

Mr. CALE-MATTHEWS said that orthodontics was included in the subjects for examination for the L.D.S. diploma according to the new schedule issued by the General Medical Council, but their regulations did not provide for any compulsory teaching of orthodontics; it was merely placed in brackets after "dental surgery." It was obviously left to the choice of the lecturer on dental surgery as to whether he should touch on the subject of orthodontics at all.

Dr. NORMAN BENNETT said that what Mr. Cale-Matthews had quoted from were recommendations of the General Medical Council, and were not compulsory. In the second place, it was important to remember that it was the principle of the General Medical Council to leave as much latitude as possible to the schools in regard to their method of teaching. The Council put down orthodontics as a subject which would form part of the examination, and left it to the schools to decide whether they were capable of teaching it with or without special lectures.

Mr. NORTHCROFT said the orthodontic teaching at the school with which he had been connected in London was always done by Mr. Chapman; the subject with which he himself had dealt was operative dental surgery, and he never poached on Mr. Chapman's preserves. He was greatly interested, however, in the thorough teaching of orthodontics, and he thought the report would be of immense help to teachers. He was very pleased to hear the remarks made about the references, which seemed to him to be very important. He thought he might say, without divulging any confidences of the Committee, that Mr. Sheldon Friel had been particularly active in collecting those references, and the Committee and the Society owed him a considerable debt of gratitude for his work in that connection, which was evidently appreciated.

Mr. HAROLD CHAPMAN said the point to which Mr. Cale-Matthews had spoken, and on which Dr. Norman Bennett had spoken, with regard to the inclusion of orthodontics in dental surgery, was one on which he felt the Society might congratulate itself, because until those recommendations of the General Medical Council which had been referred to were made he did not think the word "orthodontics" had been referred to at all either by the General Medical Council or the Examining Body of the College of Surgeons in London. The Society might perhaps take a little kudos to itself in that the word had been added; it was a step in the right direction. Mr. Pitts had said that he would not refer to the demerits of the report. For his own part, as a member of the Committee, he felt a little diffidence in doing so. He had already found the report extremely valuable, and would continue to do so, but from the teaching point of view there were one or two practical points which, if it had been possible to include them in the report, would have been of great help, he thought, to many. The preparation of the report took a long time, and to have gone further would probably have taken much longer and been extremely difficult, but he felt it would have been very helpful if in the report could have been included a chart for use in schools, or even suggestions for a chart, and also a list of the instruments which it was necessary for a student to possess. The want of both those things, and particularly a list of instruments, was a great handicap in the teaching of orthodontics. There were certain things which it was almost im-

possible to do without, and yet in very many instances they were not included in the kits, presumably because they added so very considerably to the expense.

Another point which was always cropping up was as to what cases the students should be allowed to handle. He always felt great diffidence in allotting a difficult case to a student, and yet it seemed impossible to refuse treatment to such patients when it was so urgently needed by them for their ultimate benefit. He fully realised that such points were almost impossible of solution in a report such as that under discussion, but they were of very great practical moment, and if a solution, or even a partial solution, of them could be obtained he was sure it would be of great help to those who had to teach the subject of orthodontics.

Mr. J. H. BADCOCK, in reply, thanked Mr. James for calling attention to a clerical error in the syllabus of clinical work; the two paragraphs should, of course, be the same. He also thanked the members for the way in which they had received the report; it was a great encouragement to the Committee to know that their labours were appreciated.

The minutes of the previous meeting were read by the SECRETARY, and were confirmed and signed.

The CHAIRMAN announced that Mr. Edmund Claremont was present as a visitor.

The following new members were elected: J. F. Howard Clarke, L.D.S.Eng., 52, Shaftesbury Avenue, W.1; V. Fitzgerald Sargent, L.D.S.Eng., 7, Harley Street, W.1; Arthur Hammond-Smith, L.D.S., 1, Highbury Place, N.5.

ELECTION OF OFFICERS AND COUNCILLORS.

The CHAIRMAN announced that as no other nominations had been received, the following Officers and Councillors, who had been nominated by the Council, were elected:—

President	Mr. W. W. JAMES.
Immediate Past President ...	Mr. SIDNEY SPOKES.
Vice-Presidents	Mr. SHELDON FRIEL.
	Mr. G. F. CALE-MATTHEWS.
	Mr. H. C. HIGHTON.
Secretary	Mr. HAROLD CHAPMAN.
Treasurer	Mr. WILLIAM OVEY.
Curator	Mr. B. MAXWELL STEPHENS.
Librarian	Mr. BERTRAM SAMUEL.
Editor	Mr. CARL SCHELLING.
Councillors	Mr. A. H. CLOGG.
	Mr. A. T. PITTS.
	Mr. J. H. BADCOCK.

Candidates approved by Council for election: J. F. Howard Clarke, L.D.S.Eng., 52, Shaftesbury Avenue, W.1; V. Fitzgerald Sargent, L.D.S.Eng., 7, Harley Street, W.1; Arthur Hammond-Smith, L.D.S., 1, Highbury Place, N.5.

ELECTION OF TWO AUDITORS.

The CHAIRMAN said that two auditors for the year 1923 had to be appointed.

Mr. A. T. PITTS proposed, and Mr. NORTHCROFT seconded the appointment of Mr. Packham.

Mr. MAXWELL STEPHENS proposed, and Mr. BADCOCK, seconded the appointment of Mr. Mayer.

There being no further nominations, these gentlemen were unanimously elected.

REPORT OF THE HONORARY TREASURER.

The HON. TREASURER (Mr. Highton) presented the following Balance Sheet:—

THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS.

STATEMENT OF ACCOUNTS from December 1st, 1921, to November 30th, 1922.

1920-1921. £ s. d.	RECEIPTS.		1921-1922. £ s. d.
187 2 8	Cash at Bank	150 0 0	
		42 8 2	
8 1 1	Interest on Exchequer Bonds	5 14 1	
0 7 3	Cash in Hand	1 3 3	
119 12 10	Subscriptions received during year ...	151 2 10	
£315 3 10		£350 8 4	

1920-1921. £ s. d.	PAYMENTS.		1921-1922. £ s. d.
15 15 0	Rent		15 15 0
	Special Council Meetings		1 10 0
37 9 9	Printing		33 12 11
18 18 0	Reporting		24 3 0
6 6 0	Hire of Epidiascope		7 7 0
8 15 0	Refreshments		8 15 0
29 15 0	Transactions		50 3 0
	Librarian		11 19 6
	Curator		6 6 0
	Typing		7 10 6
4 13 8	Postages, 'Phone and Sundry Expenses		5 2 1
			172 4 0
	To correct error by Bank (Mr. McKeag's sub.)		1 1 0
	3 Subscriptions Remitted (Messrs. Coe, Jeffreys & Turner)		3 3 0
			176 8 0
	Balance at Bank :—		
150 0 0	By Exchequer Bonds		150 0 0
42 8 2	Cash at Bank		22 0 6
	Cash in hand—Hon. Secretary	0 19 4	
1 3 3	Hon. Treasurer	1 0 6	
			1 19 10
£315 3 10			£350 8 4

We have examined the Books and Vouchers and certify the above Statement of Accounts to be correct.

(Signatures) F. St. J. STEADMAN.
G. PATON POLLITT.
Hon. Auditors.

In doing so, he called attention to the fact that from December 1st, 1921, to November 30th, 1922, the total income of the Society amounted to £156 16*s.* 11*d.* which included £5 14*s.* 1*d.* interest on Exchequer and Treasury bonds. The expenditure amounted to £176 8*s.*, and the available bank balance was £22 0*s.* 6*d.*, in addition to which the Society had £100 invested in 7 per cent. Treasury Bonds and £50 in $5\frac{3}{4}$ per cent. Exchequer Bonds.

The CHAIRMAN thought the Society might congratulate itself upon its satisfactory financial position, and was very much indebted to the Hon. Treasurer for the way in which he had discharged his duties. Mr. Highton had served the Society as Treasurer for a great number of years, but was now retiring from that office. He was sure the members would wish to offer him their grateful thanks for the way in which he had carried out his work during the whole of that period.

Mr. NORTHCROFT understood that during the past year the expenditure had amounted to £176, as against an income of £156. He was glad there was a balance at the bank to meet the deficit so caused, but thought the Society should be careful in future to see that its expenditure did not exceed its income.

The HON. TREASURER said that during the past year the Society had been honoured with several important communications, and in particular one from Sir Arthur Keith, which involved the Society in considerable expense for publishing, printing and circularising. The Society had had to pay half the cost of the blocks to the Dental Manufacturing Company and also a portion of the expense of printing the paper for circularisation among the members. He did not think similar expenditure would prove necessary in the future. But for the expense incurred in connection with the paper in question the accounts would probably have shown a small surplus. At the end of the previous year there was a balance at the bank of £45, and at the present time there was still £22 0*s.* 6*d.* available, in addition to the invested funds.

Mr. NORTHCROFT said he was well satisfied with the explanation given, and had much pleasure in moving the adoption of the Report.

Mr. J. H. BADCOCK seconded.

The motion was then put and carried unanimously.

Mr. A. T. PITTS proposed that a hearty vote of thanks be accorded to Mr. Highton for his arduous labours as Treasurer.

The CHAIRMAN said that in view of the applause with which the proposition had been received he thought there was no need to put it formally. Carried.

REPORT OF THE HON. CURATOR.

The CURATOR (Mr. B. Maxwell Stephens) read the following Report :—

In my last Report you were made aware of the decision of your Council to purchase a cabinet in which to maintain the library and museum. The Society, however, was relieved of this necessarily large expenditure by the retiring President, Mr. Lewin Payne, who, having already shown great interest in the project, ended his year of presidency by generously making a gift of the cabinet. At present it stands in a corner of this room. You doubtless inspected the interior, in which there is plenty of space.

I would take this opportunity of appealing to members to adopt the system of storing their models in convenient boxes. If they would, we should then, I feel sure, in time have the necessary collection of material for investigation, and this would contribute to the elucidation of some of our problems as orthodontists.

Other gifts have been made to the museum by Mr. Cale Matthews and Mr. Levin. Messrs. Northcroft, Warwick James and Cale Matthews have again promised specimens. We are very grateful to these gentlemen, but I should like next year to be able to report that I have received suitable specimens for the museum from some of the younger members.

Mr. BERTRAM SAMUEL moved the adoption of the Report.

Mr. W. W. JAMES, in seconding, said the Society felt very grateful to the Chairman for his generous gift.

The CHAIRMAN said it was not necessary to thank him for what he had done; it was a project in which he was deeply interested, and he felt that as he was responsible for getting the cabinet provided the Society should not be burdened by the small expenditure necessary, which might have necessitated realising a part of its investments.

The motion was then put and carried unanimously.

REPORT OF THE LIBRARIAN.

The LIBRARIAN (Mr. Bertram Samuel) read the following Report :—

During the current year, many additions have been made to the Library.

A gift of over twenty volumes of orthodontic interest was received from Mr. Sidney Spokes.

The library now receives in exchange for its own transactions :—

The International Journal of Orthodontics.
The Dental Cosmos.
The Journal of the British Dental Association.
The Dental Record, and
Items of Interest.

The following books have been acquired by purchase during the year :—

" Index of Dental Literature, 1916-1920."
" Practical Orthodontics." By McCoy.

The following books have been received in gift from Mr. Maxwell Stephens :—

" Growth of Bone." By McEwen.
" Surgery of the Jaws." By B. Lais.

The Librarian has several copies of old transactions, and would be pleased to hear from any members who desire to complete their sets.

He is always prepared to arrange to post volumes from the Library to members who communicate their wishes to him.

Mr. CALE-MATTHEWS proposed, and Mr. BADCOCK seconded, the adoption of the Report.

The motion was then put and carried unanimously.

REPORT OF THE HON. SECRETARY.

The HON. SECRETARY (Mr. Harold Chapman) read the following Report :—

It is a pleasure to report again that the past year's work has been successful, if one is to judge by the attendances at meetings and the new members who have been elected.

A Committee and Sub-Committee of the Society has been considering the question of orthodontic education for nearly two years. The result of their deliberations will be presented to you this evening by the Chairman of the Committee.

The Societe Francaise Orthopedie Dento-Faciale has invited this Society to send a delegate to the next meeting, to be held early in January.

The Council has asked three members to assist with displaying models in the epidiascope, so that they may be exhibited in the best manner.

A book plate for books in the Library has been approved by the Council.

The European Orthodontic Society met in London in July last and invited members of this Society to attend its meetings.

The eminent anatomist of the University of Bristol, Prof. Fawcett, and Dr. Murk Jansen, the well-known orthopædist of Leiden, Holland, who had promised papers this year, have been unable to give them ; it is hoped that they will be presented at a later date.

Permission was granted to Sir Frank Colyer to reproduce three illustrations from the paper read last December by Sir Arthur Keith and Mr. G. G. Campion in the forthcoming edition of his text-book on dental surgery.

Your Hon. Treasurer resigns as from to-day, after having held the post for ten years. He was the second to hold this post.

The membership of the Society now totals 148, including one honorary member.

During the year one member has resigned, and I regret to announce that one honorary member and one ordinary member have passed away.

Twenty-two new members have been elected, including two ladies, the first to join the Society.

The usual number of meetings have been held during the year, including one demonstration meeting. As the details of all these will be fresh in your minds I need not refer to them further.

Mr. A. T. Pitts, in moving the adoption of the Report, congratulated the Society on its excellent position.

Dr. Sim Wallace seconded.

The motion was then put and carried unanimously.

Induction of the President Elect.

The Chairman said the next item on the agenda was the President's Valedictory Address, but unfortunately, as the members had heard, the President was unable to be present that evening. It was now his pleasure, on behalf of the members, to welcome the new President, Mr. Warwick James, to the chair. He knew Mr. James as a colleague in orthodontic work, as a scientific investigator and intimately as a friend. One might refer to many of his achievements as a scientific investigator, but one has only to remember the Interim Report on Dental Caries, published during the present year, to realise the debt the profession owed him for that aspect of his work. It was a great personal pleasure, as well as an honour and privilege, to induct Mr. James into the chair.

Mr. Lewin Payne then vacated the chair, which was taken, amid applause, by Mr. Warwick James.

The President thanked Mr. Lewin Payne for his kind words, and the members for the honour they had done him in electing him President of the Society. The work of the Society was of very great interest to many, and during the time he had practised dentistry the growth of orthodontics had been greater, perhaps, than that of any other branch of the profession. One tried to acquire knowledge of all the various phases of that development, but without a Society such as theirs it would have been exceedingly difficult to attain to a complete knowledge of all the work that had been done. For a number of years, of course, information on the subject could only be obtained in a very scrappy sort of way ; until steps were taken to publish literature entirely devoted to the subject, those who wished to acquire knowledge of it were very much restricted. It was unfortunate that Mr. Spokes was unable to be present to deliver his valedictory address. It was difficult to express the debt the Society owed him for his labours as President during the past year, but perhaps someone would propose a motion expressing the Society's regret at Mr. Spokes's ill-health and their best wishes for his recovery.

Mr. J. H. BADCOCK said it would afford him great pleasure to do so. It was a great disappointment to the members not to have seen Mr. Spokes present that evening, and they particularly regretted the cause which prevented him from attending. He proposed that the Secretary be asked to write to Mr. Spokes in those terms, and expressing the hope that he would soon recover. He had been a very successful President, had taken a great interest in orthodontics for many years past and had made some very notable contributions towards its advancement. He was sure everyone regretted not having heard Mr. Spokes' valedictory address.

The PRESIDENT did not think it necessary for the motion to be seconded. The Secretary would be pleased to convey the Society's wishes, as expressed by Mr. Badcock, to Mr. Spokes. He had to express the thanks of the Society to Mr. Badcock for presenting the Report of the Committee over which he had presided; the members would show their appreciation in the usual way.

The meeting then terminated.

List of Members, Feb. 1st, 1923.

ORDINARY AND CORRESPONDING MEMBERS.

Achner, Conrad A., 47b, Welbeck Street, W.1.
Aldred, Alex. B., 359, Brixton Road, S.W.
Allen, Arthur G., 128, Queen's Road, Bayswater, W.
Aubrey, H. P., 83, Portland Place, W.1.

Badcock, G. W., 32, Brunswick Place, Hove.
Badcock, J. H., 140, Harley Street, W.
Bailey, E. R., 40, Trinity Road, Wandsworth, S.W.18.
Baldwin, Sir H., 37, Cavendish Square, W.1.
Barrett, Russell, 41, Harley Street, W.1.
Bascombe, E. D., Melford Lodge, Bourne Avenue, The Square, Bournemouth.
Bennett, F. J., 23, Grosvenor Street, W.1.
Bennett, Norman G., 50, Brook Street, W.1.
Blaaberg, C. J., 29, Queen Anne Street, W.1.
Bowes, J. A., 28, South Side, Clapham Common, S.W.
Briault, E. H. L., 145, Finchley Road, N.W.
Bryan, Hermann, 26, St. Giles's Street, Norwich.
Bryant, E. H., Chelwood, St. John's Road, Tunbridge Wells.
Bull, F. B., 58, Wimpole Street, W.1.
Bulleid, W. A., 1, Burlington Gardens, W.1.
Butchart, Jas. S., High Mead, Bolton Crescent, Windsor.
Buxton, J. L. Dudley, 38, Harley Street, W.1.
Byron, J. L., 213, North End Road, Kensington, W.14.

Campion, G. G., 264, Oxford Road, Manchester.
Campkin, Hugh T., 71, Harley Street, W.1.
Chapman, Harold, 15, Upper Wimpole Street, W.1.
Charles, S. Wilson, Devonia, Rickmansworth, Herts.
Clarence, Thomas H., 24, Upper Wimpole St., W.1.
Claremont, L. E., 5, Rodney Place, Clifton, Bristol.
Clarke, J. F. H., 52, Shaftesbury Avenue, W.1.
Clogg, Arthur H., Rockmount, 128, Church Road, Upper Norwood, S.E.19.
Coe, W. E., St. Norman's, Streatham Hill, S.W.
Colyer, Arthur R., 19, Upper Wimpole St., W.1.
Commander, Eric N., 11, Aldergate, Tamworth.
Coysh, H. A., 373, High Road, Chiswick, W.4.
Crane, Walter A., Melford Lodge, Bourne Avenue, The Square, Bournemouth.
Cribb, H. E., 15, Stratford Place, W.
Croke, Augustin E., Sussex House, Guildford.

Davie, M., 6, Carlisle Parade, Hastings.
Denham, N., 29, Albemarle Road, Beckenham.
Doherty, J. W., 140, Harley Street, W.1.
Doubleday, F. N., 48, Welbeck Street, W.1.
Dowsett, E. B., 118, Gloucester Place, Portman Square, W.1.
Dreyfus, S., 16, Grand Pont, Lausanne, Switzerland. (Corresponding Member.)

Eady, Barrington, 29, Devonshire Place, W.1.
Edey, G. Russell, 153, High Street, Bromley.
Edgar, N., 39, London Road, Enfield.

Fernie, J. G., Holmleigh, Murray Road, Northwood, Middlesex.
Fisk, Sidney W., Street Lodge, Essex Rd., Watford.
Fox, Reginald A., 13, Wetherby Gardens, S.W.3.
Friel, Sheldon, 3, Fitzwilliam Place, Dublin.
Fry, W. Kelsey, Guy's Hospital, S.E.1.

Gardner, Stanley M., 24, Upper Wimpole St., W.1.
Garrow, A., 115, Harley Street, W.1.
Goldie, George J., 14, Upper Wimpole Street, W.1.
Grayson, J. Kenneth, Mount Pleasant, Turner's Hill, Cheshunt, Herts.
Green, W., South View, 10, North Common Road, Ealing, W.

Hammell, D. H., 19, Upper Wimpole Street, W.1.
Harborow, G. J., 38, Woburn Square, W.C.1.
Henry, C. J., 78-79, King William Street, E.C.4.
Henry, P. F., 79, King William Street, E.C.4.
Highton, Herbert C., 17, Harley Street, W.1.
Hopson, Montagu F., 7, Harley Street, W.1.
Housden, C. H., Thurnby, Jenner Road, Guildford

Iago, Miss P., 1, Devonshire House, High Road. Brondesbury, N.W.2.

James, W. W., 2, Park Crescent, Portland Pl., W.1.
Jameson, Alfred, 18, Jesmond Road, Newcastle-on-Tyne.
Jameson, J. T., 12, Windsor Crescent, Newcastle-on-Tyne.
Jennings, E. A., 4, Queen's Walk, Ealing, W.5.
Johnson, Arthur W., 71, Grosvenor Street, W.1.
Johnson, Gordon, 46, Lee Terrace, Blackheath, S.E.
Johnson, W. Trevor, 42, Sheep Street, Stratford-on-Avon.
Jones, Wm., 2, Colosseum Terrace, N.W.
Jones, H. Llewelyn, 9, Harley Street, W.1.

Knaggs, S. A., 21, Rosslyn Hill, Hampstead, N.W.
Knowles, C. Heygate, 15, Worsley Road, Hampstead, N.W.

Lacey, A. G., 19, Harley Street.
Lake, Carol P., 22, Sauthernhay West, Exeter.
Lawrence, F., 35, Brompton Road, S.W.3.
Levin, H., 63, Wimpole Street, W.1.
Leyton, G., 12, rue Belliard, Bruxelles. (Corresponding Member).
Lees, C., Breifond, Boyne Road, Tunbridge Wells.
Lindsay, Mrs. L., 23, Russell Square, W.C.1.
Lindsay, Robert, 23, Russell Square, W.C.1.
Lockett, A. C., Hereford House, 117, Park St., W.1.

McBride, John, 26, Duke's Avenue, Muswell Hill, N.
McKeag, H. T. A., 33, College Gardens, Belfast.
McKechnie, J. D., 29, Queen Anne Street, W.1.
McMahon, G. E., Connaught House, Beckenham, Kent.
Malleson, H. C., 30, Thurlow Rd., Hampstead, N.W.
Marsh, H. E., 1, Cantelupe Road, Bexhill, Sussex.
Marston, Allan T., 74, South Side, Clapham Common, S.W.4.
Mason, E. N., Sandown, 306, Broadway, Bexley Heath.
Matthews, G. F. Cale, 60, Newhall St., Birmingham.
Matthews, Trevor, 42, Sheep Street, Stratford-on-Avon.
May, W. J., 24, Upper Wimpole Street, W.1.
Mayer, J. W., Stedham House, Surbiton Hill.
Mellersh, W. Francis, 9, Harley Street, W.1.
Mendleson, B., 53, Queen Anne Street, W.1.
Messenger, H. L., 47, Rosslyn Hill, N.W.3.
Morris, C. S., 88, Park Street, W.1.
Morris, L. F., West Moor, Poole Road, Bournemouth.

Newton, Sydney B., Brooklands, Uxbridge Road, Acton Hill, W.3.
Northcroft, George, 115, Harley Street, W.1.

Olver, S. Holloway, 42, Devonshire Street, W.1.
Ovey, William, 42, Gloucester Gardens, W.2.

Packham, A. L., 2, Park Crescent, Portland Place, W.1.
Parfitt, J. B., 179, King's Road, Reading.
Parker, Geo., 181–183, Edward Street, Brisbane, Australia.
Pavitt, P. G., 57A, Wimpole Street, W.1.
Payne, J. L., 18, Portland Place, W.1.
Payne, A. Ll. Spencer, Beechcroft, Colney Hatch Lane, Muswell Hill, N.10.
Pearce, F. J., 57A, Wimpole Street, W.1.
Pearce, R. Marson, 21, Oil Mill Lane, Kingston-on-Thames.
Phillips, Edward, 1, Frognal, N.W.3.
Philpots, Montague, 14, High Street, Windsor.
Pitt, Edward, Brandhoek, Gerrard's Cross, Bucks.
Pitts, A. T., 22, Wimpole Street, W.1.
Pollitt, G. Paton, 50, Brook Street, Hanover Square, W.1.
Pritchard, Geo. B., 18, Portland Place, W.1.

Rilot, Chas. F., 22, Wimpole Street, W.1.
Roe, Samuel H., 60, Newhall Street, Birmingham.
Rowlett, A. E., 165, London Road, Leicester.
Rushton, W., 32, Harley Street, W.1.

Salt, H. O., 24, St. Thomas' Street, London Bridge, S.E.1.
Samuel, Bertram B., 76, Wimpole Street, W.1.
Sargent, V. F., 7, Harley Street, W.1.
Schelling, C., 37, Cavendish Square, W.1.

Scott, P., 42, Devonshire St., Portland Place, W.1.
Shore, H. D., 85, Gloucester Place, Portman Square, W.1.
Skipper, T. G., 52, Welbeck Street, W.1.
Smith, A. Hammond, 1, Highbury Place, N.5.
Smith, J. Stuart, 3, Queen's Road, Tunbridge Wells.
Spiller, J. E., 62, Worple Road, Wimbledon.
Spokes, P. Sidney, Castle Place, High Street, Lewes.
Steadman, Sydney Francis St. Jermain, 9, Welbeck Street, W.1.
Stephens, B. Maxwell, 76, Grosvenor Street, W.1.
Stordy, Thos., 42, Claremont Road, Surbiton.
Sturridge, Ernest, 29A, Wimpole Street, W.1.

Tebbutt, E. Spencer, 30, Finsbury Square, E.C.2.
Thew, W., 14, Upper Wimpole Street, W.1.
Thomson, George, 142, Harley Street, W.1.
Toit, J. J. du, 11, Leevenovet Rd., Tambverskloof, Cape Town.
Torrance, T. A., 29, Queen Anne Street, Cavendish Square, W.1.

Visick, Hedley, The Wolds, College Road, Eastbourne.

Wallace, Dr. J. Sim, 150, Harley Street, W.1.
Watkin, Harold G., 95, Durning Road, Liverpool.
Webb, W. T. Clarkson, 41, Wimpole Street, W.1.
Whittington, W. W., The Firs, Elm Road, Sidcup.
Wilson, A. G., 9, Sandyford Place, Glasgow, W.
Winderling, Prof. Aldo Maggioni, Via Manzoni 45, Milan, Italy. (Corresponding Member).
Wood, Bryan J., 7, London Road, Kettering.
Wright, J. Snarey, 37, Cavendish Square, W.1.
Wright, Leslie D., 1; Wellfield Avenue, Muswell Hill, W.10.

HONORARY MEMBER.

Keith, Prof. Sir A., Royal College of Surgeons, W.C.1.